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# Renewable Resource and Water Development Programs

PROJECT EVALUATIONS  
AND RECOMMENDATIONS  
FOR 1990-1991 BIENNIUM  
and 1988-1989 BIENNIUM  
STATUS REPORT

Presented to the Fifty-first  
Montana Legislature

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RENEWABLE RESOURCE AND WATER  
DEVELOPMENT PROGRAMS

Project Evaluations and Recommendations for  
1990-1991 Biennium

and

1988-1989 Biennium Status Report

DEPARTMENT OF NATURAL RESOURCES  
AND CONSERVATION  
JANUARY 1989



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## INTRODUCTION

The Water Development Program was established in 1981 to allow the state to take a more active role in water development in the face of declining federal participation. This program was a major commitment by the State of Montana to promote water development and to target the following actions:

1. Rehabilitate state-owned dams
2. Assist conservation districts in the implementation of water reservations
3. Investigate hydropower development potential in state-owned dams
4. Promote offstream and tributary storage
5. Promote joint state, tribal, and federal involvement in project development
6. Develop a loan and grant program for water development
7. Provide for administrative expenses

This report addresses these major areas and focuses on the loan and grant program. The loan and grant program has three major parts: grants, loans under \$200,000 funded by general obligation bond proceeds, and loans over \$200,000 funded by coal severance tax bond proceeds.

## CHAPTER I

### THE WATER DEVELOPMENT PROGRAM - GRANTS AND LOANS UNDER \$200,000

#### A. Program Description and History

The Water Development Program was established in 1981 by the Montana Legislature to promote and advance the beneficial use of water, and to allow the citizens of Montana to achieve full use of the state's water by providing grant and loan financing for water development projects and activities. Projects and activities must be water related and may be for feasibility work, demonstration projects, or construction projects. Eligible proposals have included rehabilitation of irrigation projects; dam or reservoir construction; control programs for saline seep, groundwater investigations, development of water-based recreation facilities; streambank stabilization and other erosion control programs; development of water supply, water treatment, or rural water systems; and development of gravity sprinkler irrigation systems. Public entities and private individuals, partnerships, and corporations are eligible to apply.

#### B. Program Funding

Funding for the water development grant program is derived from two sources: the coal severance tax and interest income from the resource indemnity trust fund. The program receives 0.625 percent of the gross coal severance tax and 30 percent of resource indemnity trust interest income each biennium. Grant funds are disbursed to approved projects based on their priority ranking as revenues are generated throughout the biennium.

Water development project loans of less than \$200,000 can be made for projects with repayment capacity from the sale of Montana Water Development General Obligation Bonds. Loans are offered at the interest rate at which the state bond is sold. In 1984 that rate was 8.71 percent, and 1985 rates were 7.22 percent and 6.92 percent. Interest rates on loan proceeds from the 1987 bond sale are at 7.32 percent.

#### C. Program Administration and Project Review Procedures

The Water Development Bureau of the Water Resources Division in the Department of Natural Resources and Conservation (DNRC) administers the Water Development Program. The DNRC develops the application form and solicits proposals from the agricultural community, local governments, irrigation and conservation districts, state government, and the university system. All grant applications and loan applications from public entities are submitted to the DNRC in the even-numbered years prior to each legislative session. Each proposal must include information to enable technical, economic, financial, and environmental assessments. The DNRC evaluates the proposals and solicits technical and financial review assistance when appropriate.

Following the assessment review, feasible projects and activities are ranked by the DNRC using established program and financial need criteria. A funding priority and funding amount recommendation is then prepared for consideration by the Water Development Advisory Council appointed each biennium by the governor in accordance with Section 2-15-22, MCA. After the Council's review, the DNRC makes a recommendation to the governor, who in turn makes the final recommendation to the legislature. Legislative approval is required for all grants and for all loans to public entities.

After the legislature passes an appropriation bill for the program, DNRC staff works with successful applicants on a scope of work (or work plan), which is incorporated into a grant agreement between the applicant and the department. Each contract in addition to the detailed scope of work includes a completion schedule and budget. Funds are disbursed as revenues become available and in accordance with the project schedule. Sponsors of the successful applications are required to submit periodic progress reports and final project reports, which are used along with field visits to monitor project progress and completion. Loan sponsors are required to submit annual financial reports on the funded system during the life of the loan.

Private loans made to individuals, partnerships, and corporations are approved by the DNRC director. Applications for private loans may be made at any time throughout the biennium. The DNRC reviews all private loan applications for technical and financial feasibility. Availability of funds for approved projects is contingent on the availability of state bond proceeds. The department initiates a state bond sale as needed to make funds available for private loans.

#### **D. Project Ranking and Funding Recommendation Procedures**

The DNRC develops the ranking order priority and funding level recommendations for presentation to the governor and in turn to the legislature. These priorities reflect the specific criteria and preferences stated by law for the use of water development funds. These criteria are:

1. The project optimizes public benefits and enhances public resources
2. The project fully utilizes water, and promotes conservation and efficient use of the resource
3. There is need and urgency for the project
4. The project is part of a family farm operation
5. The project uses reserved water



6. The project is a water storage project

The Board of Natural Resources and Conservation and the Water Development Advisory Council have adopted several other criteria for the ranking system, primarily to make the water development and renewable resource programs compatible. These criteria are:

1. The project has potential for statewide application
2. The project has not previously received funds
3. The project does not take prime agricultural land out of production

Funding priority is determined by how well a project scores under these criteria.

Once the priority of projects is established, a recommended grant amount is developed for each project as follows:

1. Construction projects with repayment capacity, such as a community water or sewer project, can receive a grant of 25 percent of the total project cost up to \$50,000 as a grant. Consideration is also given to the financial capability of the project sponsor. This is done to give credit to an entity which has taken on a heavy debt burden to solve its problems. The maximum project cost or request considered is \$200,000. Larger requests are recommended for funding from the Coal Severance Tax Loan Program. Once the funding level is established, consideration is given to the viability of the project. If the recommended grant is less than the request, the remainder is provided with a loan recommendation. If a project's priority is such that it will not receive a grant, the project sponsor can take the recommended grant amount as a loan instead.

2. Projects with no repayment capacity may be recommended for up to 100 percent funding.

3. No project is recommended to receive more than a \$100,000 grant because of extreme competition for these funds.

**E. 1986 Grant and Loan Applications for Funding in FY90-91**

A total of 41 grant applications for water-related projects and activities were received in 1988 under the Water Development (WD) and Renewable Resource Development (RRD) programs. Applications for water projects from both public and private entities are eligible under the WD program, while only public entities are eligible to apply under the RRD program.

Since all of the water-related applications from public entities are eligible under both the WD and RRD programs, the DNRC assigned applications to the funding program deemed most

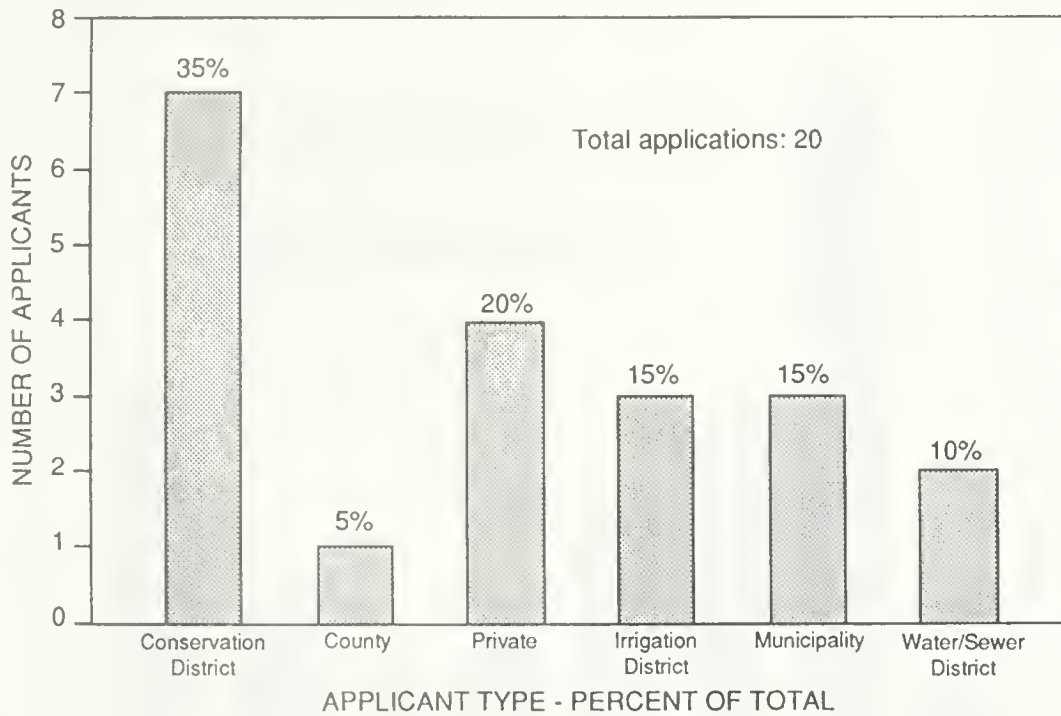
appropriate. Table 1 lists the 20 projects that have been considered under the WD program. The table details the priority ranking and funding recommendations for each of the water projects.

Budget projections for FY90-91 indicate that approximately \$284,231 may be available for grants under the WD program. Eligible water projects not likely to receive funding under the WD program will be considered under the RRD program using RRD ranking criteria. As of this writing, it appears that the first five project applications in Table 1 are likely to be approved for funding with water development funds.

Although the DNRC has sufficient loan authority through the sale of bonds to meet the loan demand, grant requests far exceed revenues available for grants. Requests for grants under both programs totaled more than \$3.5 million. total revenues available for grants are projected to be \$1.4 million, combining the RRD allocation of \$1,138,700 with the WD estimated revenues of \$284,231. The amounts given are based on budget projections and are subject to change.

Figures 1.1 and 1.2 on the following page show the number and types of projects that were considered, and the number of applications submitted by different types of applicants. Figure 1.3 depicts the amount of grant funds requested for the various project types in 1988.

**FIGURE 1.1**  
**WATER DEVELOPMENT PROGRAM**  
**APPLICANTS BY APPLICANT TYPE - 1988**



**FIGURE 1.2**  
**WATER DEVELOPMENT PROGRAM**  
**APPLICANTS BY PROJECT TYPE - 1988**

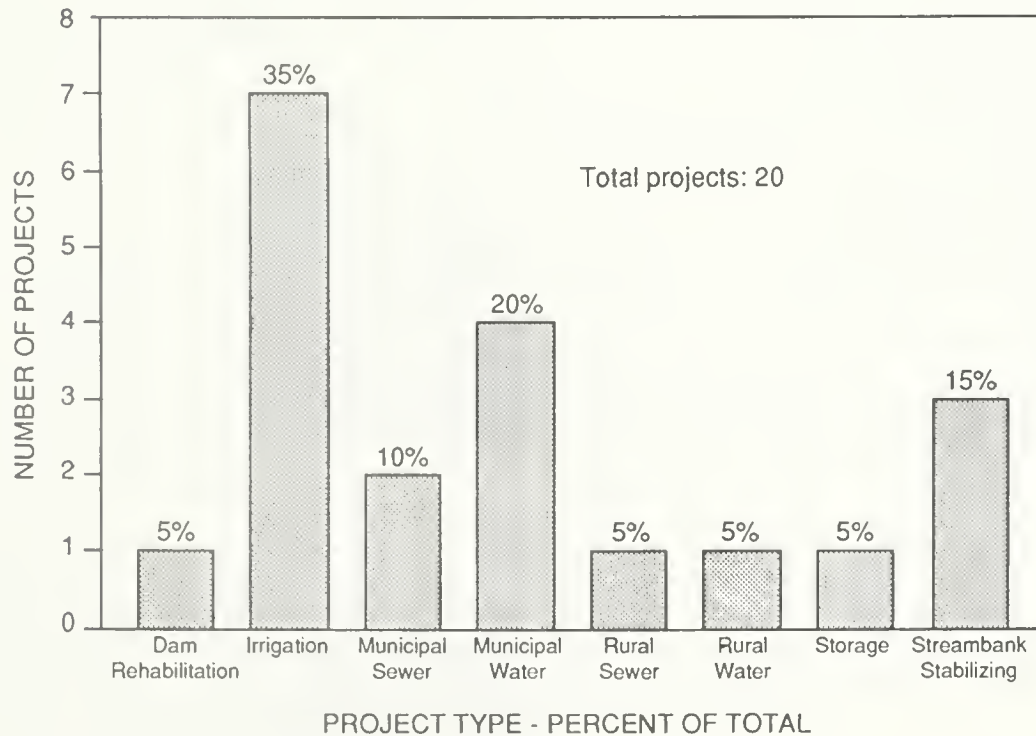




FIGURE 1.3  
**WATER DEVELOPMENT PROGRAM**  
REQUESTED FUNDING BY PROJECT TYPE - 1988 APPLICATIONS

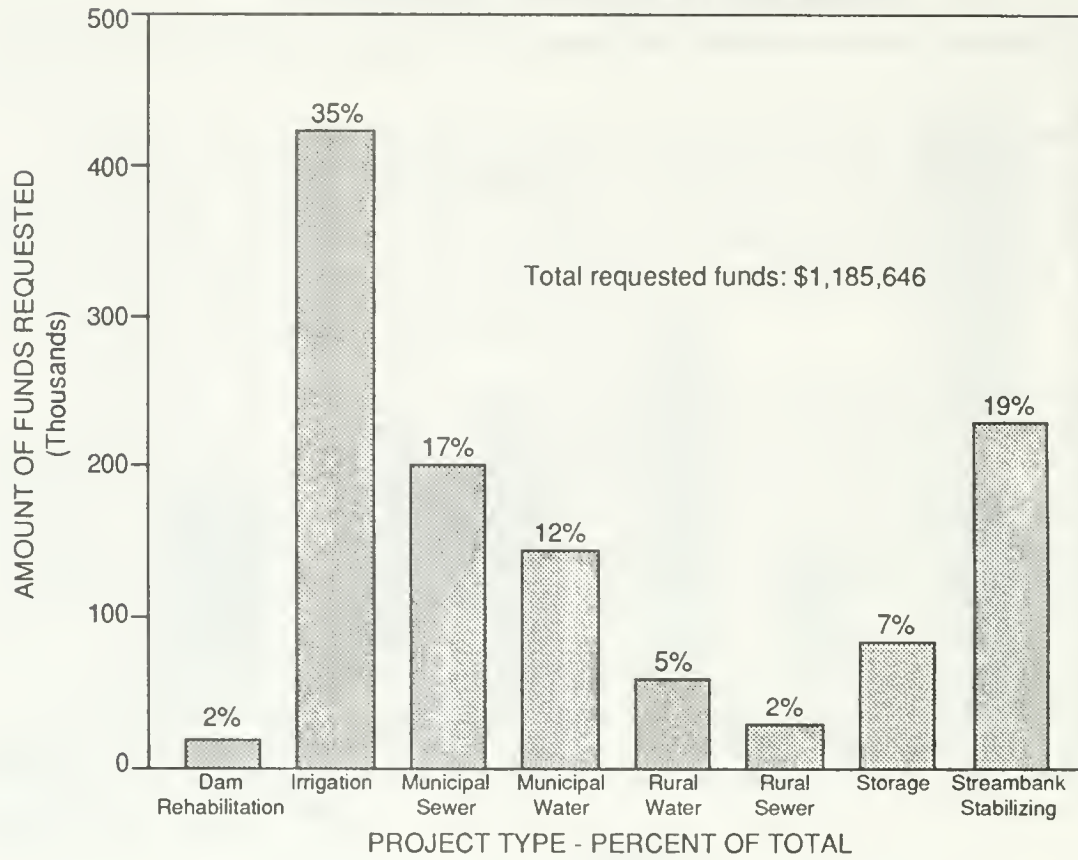


TABLE 1

WATER DEVELOPMENT PROGRAM 1990-1991  
PRIORITY RANKING AND FUNDING RECOMMENDATIONS

APPLICANT	PROJECT NAME	PUBLIC BENEFIT	NEED AND URGENCY	STATEWIDE APPLICATION	PREVIOUS FUNDING	FAMILY FARM	AG. LAND OUT OF PRODUCTION	RESERVED WATER	WATER STORAGE	WATER DEVELOPMENT TOTAL	RECOMMENDED GRANT	RECOMMENDED LOAN	ACCUMULATIVE GRANT TOTAL
1 DALY DITCHES IRRIGATION DISTRICT	REPUBLICAN WEST DIVERSION REPLACEMENT	26	6	2	5	3	5	0	0	47	\$100,000		\$100,000
2 PRIVATE APPLICANT	WATER SYSTEM TECHNICAL ADVISOR	22	10	10	5	0	5	0	0	44	\$50,000		\$160,000
3 BEAVERHEAD & MILE HIGH CD S	BIG HOLE RIVER CHANNEL STABILIZATION	22	7	2	5	0	5	0	0	44	\$50,000		\$160,000
4 PRAIRIE COUNTY CONSERVATION DIST	WATERSHED DEMONSTRATION/MANAGEMENT PRACTICES	18	5	4	5	5	5	0	0	43	\$68,981		\$191,742
5 PRAIRIE CONSERVATION DISTRICT	PARK BRANCH SEDIMENT DIVERSION	19	6	4	5	3	5	0	0	43	\$24,857		\$216,599
6 CARBON CONSERVATION DISTRICT	WUSHAW CREEK EROSION CONTROL	18	6	4	5	3	5	0	0	42	\$100,000		\$316,599
7 PRIVATE APPLICANT	WATER CREEK DEGREED LIVER IRRIGATION SYSTEM	18	10	2	5	5	5	0	0	42	\$29,558		\$346,157
8 CARBON CONSERVATION DISTRICT	ROCK CREEK DEGREED LIVER IRRIGATION	18	4	4	5	5	5	0	0	42	\$30,000		\$376,157
9 HUNTLEY PROJECT IRRIGATION DIST	MAIN CANAL MEASURING & FLOW CONTROL	19	4	4	5	5	5	0	0	42	\$44,268		\$420,425
10 CASCADE COUNTY	SUN PRAIRIE VILLAGE WASTEWATER	17	10	1	5	0	5	0	0	38	\$32,023	\$150,000	\$452,448
11 PRIVATE APPLICANT	GRAVITY SPRINKLER PROJECT	14	5	5	5	5	5	0	0	36	\$44,268		\$496,716
12 GREENFIELDS IRRIGATION DISTRICT	GREENFIELDS LATERAL REMEDIATION	11	5	2	5	5	5	0	0	30	\$43,082		\$539,798
13 GREENTOWN TOWN OF	CARROLL DAM FEASIBILITY STUDY	14	3	2	2	0	5	0	3	29	\$84,500		\$624,298
14 DUTTON TOWN OF	WATER TREATMENT PLANT PROJECT	15	3	0	3	0	5	0	0	28	\$24,500		\$648,798
15 POPLAR TOWN OF	WATER SYSTEM IMPROVEMENTS	11	6	2	5	0	5	0	0	26	\$50,000		\$698,798
16 TROY CITY OF	PARK CITY WATER DEVELOPMENT	8	4	0	5	0	5	0	0	23	\$19,150		\$717,948
17 STILLWATER CONSERVATION DISTRICT	BIG SAs DAM	8	4	1	5	0	5	0	0	23	\$19,150	\$45,474	\$767,422
18 PRIVATE APPLICANT	FIRE HYDRANTS FOR TROUT CREEK WATER SYSTEM	7	7	1	5	0	5	0	0	23	\$18,720		\$786,142
19 GREENTOWN CONSERVATION DIST	STONER CREEK RD & WOODACRES MAIN EXTENSIONS	5	2	1	5	0	5	0	0	18	\$28,500		\$814,642
20 LAVERGIDE WATER DISTRICT		5	2	1	5	0	5	0	0	18	\$28,500		\$843,142

TOTAL REQUESTED GRANTS-----\$1,185,646  
TOTAL PROJECTED REVENUES-----\$284,231

APPLICANT NAME: Daly Ditches Irrigation District

PROJECT/ACTIVITY NAME: Republican West Diversion Replacement

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: \$33,300 - Daly Ditches  
Irrigation District  
\$36,000 - Soil Conservation  
Service Technical Assistance  
\$50,000 - Soil Conservation  
Service RC&D Grant

TOTAL PROJECT COST: \$219,300

PROJECT DESCRIPTION:

The Daly Ditches Irrigation District provides water for approximately 800 water users irrigating 13,600 acres east of Hamilton. District facilities include six canals, including the Republican Canal. The Republican Canal and its diversion structure were built in 1895 and presently serve 300 water users irrigating 2,743 acres.

The Republican Canal diversion structure consists of two crib-type check structures separated by an island in the Bitterroot River. The east structure is 250 feet long and the west structure is 88 feet long. Both structures are being undermined by head cutting and are in need of replacement. The district believes the west structure will not survive the next normal runoff. For this reason, the district is requesting grant funding to replace the west side diversion with a concrete structure designed to SCS standards. The district anticipates replacing the east side structure as funds become available, but no later than 1992.

TECHNICAL ASSESSMENT:

The riverbed elevation upstream of the diversion structure is estimated to be 11 feet higher than the downstream riverbed elevation. This condition would result in significant channel destabilization should either the east or west side diversion structures fail. The exact effect of this destabilization is difficult to assess without more site specific stream channel data, but there is great potential for damage to existing structures, beneficial uses, and the fishery both upstream and downstream of the present diversion structure.

It is well documented that the structures have been significantly degraded by headcutting and that replacement is needed. The alternatives investigated include pumping from the river or expanding a portion of the Hedge Ditch and adding a drop pipe to the Republican Ditch. Both alternatives would abandon

the existing structure. Because these alternatives do not address the potential for channel destabilization if the existing diversion is allowed to degrade, they were not considered further. It is not clear whether alternate diversion structures to the proposed concrete structure were investigated. Concrete is probably the most expensive alternative and if both the east and west diversions are to be replaced, the cost of concrete might be prohibitive. A preliminary analysis considering lower cost alternatives should be performed to ensure the district is pursuing the best alternative.

The Department of Fish, Wildlife and Parks, Bitterroot Trout Unlimited, the Department of Health and Environmental Sciences, and the Soil Conservation Service all support the need for the project. An SCS engineer recommended that planning and design should include both the east and west side structures to ensure optimum structural efficiency. Presently, the SCS intends to include both structures in its design effort.

#### FINANCIAL ASSESSMENT:

The project budget includes \$3,300 for contract administration (Daly Ditches Irrigation District), \$36,000 for engineering and project administration (SCS), and \$180,000 for project construction (DNRC - \$100,000, RC&D - \$50,000 and Daly Ditches Irrigation District - \$30,000). A detailed cost analysis for project construction was not provided in the application, and it is not possible to assess the accuracy of the cost estimate. In very general terms, the cost estimate seems reasonable, but appears to be based on very preliminary designs. Presently, the district charges approximately \$12.00 per acre for O & M.

#### ENVIRONMENTAL ASSESSMENT:

Completion of this project would prevent failure of the existing structure and thereby avoid channel destabilization and the associated adverse effects. However, it only solves part of the problem as the east side diversion structure is significantly degraded and the risk of failure is considerable. Such a failure would destabilize the channel and may result in damage to private and public resources. Construction activities associated with this project would result in temporary land and riverbed disturbance.

#### RECOMMENDATION:

A grant of 50 percent of project cost up to \$100,000 is recommended contingent on DNRC approving the project scope of work and budget.

APPLICANT NAME: Private Applicant

PROJECT/ACTIVITY NAME: Technical Assistance Advisor

AMOUNT REQUESTED: \$60,000

OTHER FUNDING SOURCES AND AMOUNTS: \$178,500 - Applicant  
\$7,500 - State Agencies &  
Manufacturers

TOTAL PROJECT COST: \$246,000

PROJECT DESCRIPTION:

The applicant is a private, non-profit Montana corporation providing technical assistance and training to rural water system owners and operators through on-site visits and workshops. Assistance is given in the proper maintenance and repair of water systems, and plant operators and administration personnel are trained in conservation techniques and procedures. Grant monies would continue support for a full-time technical assistance advisor to allow the assistance program to cover a larger area of the state, and would pay for an additional six training and conservation workshops.

TECHNICAL ASSESSMENT:

With the decrease in availability of funds, combined with increasing costs of water contamination potentials, and a rising cost in production and equipment, the demands on the staff have been such that some water system operators have had to be turned down when they asked for assistance.

Technical assistance is presently being offered through at least 700 visits to water systems annually, and at least 12 regularly scheduled workshops provide training in operational procedures and water conservation. This project would add at least 300 visits to water systems and at least 3 additional training and conservation workshops annually to the present program. Because most of the rural communities in the state cannot afford to pay for highly trained operators to run their water systems, this corporation provides a needed and cost-effective alternative.

The project would also allow time for existing personnel to compile a directory of existing water systems. The directory would include water rates, water sources, operator salaries, and system types. The applicant intends to compile a directory of suppliers for community use.

FINANCIAL ASSESSMENT:

Of the \$60,000 grant, \$36,000 will be for the technical advisor's salary; \$12,000 for travel; \$3,520 for training material and equipment rental; and the remaining \$8,400 for



associated administrative costs, fringe benefits, taxes, and a bookkeeper's salary.

Funds that are received from the National Rural Water Association are federal money. Federal support for this program has been strong and funds are not currently threatened.

The corporation received a \$21,000 Water Development grant in 1985 to fund a part-time technical advisor, \$825 to purchase leak detector equipment, and a \$60,000 Water Development grant approved in 1987 which has yet to be contracted since funds won't be available until later this year. This grant would be a continuation of the 1987 funding approval.

ENVIRONMENTAL ASSESSMENT:

No adverse environmental impacts are expected as a result of this project.

RECOMMENDATION:

A grant of up to \$60,000 is recommended contingent on DNRC approval of the project scope of work and budget. The National Rural Water Association funding contribution must be documented to insure that Water Development funds are providing no more than 25 percent of the total cost.

- 3 -

APPLICANT NAME: Beaverhead and Mile High Conservation Districts

PROJECT/ACTIVITY NAME: Big Hole River Channel Stabilization

AMOUNT REQUESTED: \$31,742

OTHER FUNDING SOURCES AND AMOUNTS: \$785 - Conservation  
Districts - (in-kind)  
\$2,500 - Department of Fish,  
Wildlife and Parks

TOTAL PROJECT COST: \$35,027

PROJECT DESCRIPTION:

The Big Hole River above the town of Melrose is divided into two channels. Historically, the east channel of the river has been the dominant channel, carrying a majority of the flow. Two large irrigation diversions and the town of Melrose have relied on the larger flows of the east channel to supply water to the irrigation ditches and to recharge groundwater supplies upon which wells in Melrose depend.

For the past eight years or more, the west channel of the river has been capturing an ever greater portion of the river's flow. Problems caused by the relatively recent change in dominance of the channels are: 1) greater difficulties in obtaining irrigation water; 2) periodic drying of wells in

Melrose; 3) degradation of the fishery habitat in the east channel; 4) potential loss of agricultural land and increased bank erosion as the west channel enlarges, and 5) a potential loss of a county bridge over the west channel. The popular Salmon Fly Fishing Access located on the east channel is also becoming increasingly unuseable.

To reverse the change in channel dominance and to provide stable flows through each of the channels, the applicant is requesting funding to install a drop structure on the west channel and a sill structure on the east channel.

#### TECHNICAL ASSESSMENT:

The reversal of channel dominance has become obvious over the past eight years. In 1984, the two-channel reach was flown and photographed. In 1986, the reach was again photographed to document the rapid progression of the channel change process. In 1987, a private firm with experience in river channel changes was employed to develop plans for allowing the river to maintain a more stable division of flows between the two channels.

The plan, developed by Geomax of Bozeman, calls for the installation of a rock drop structure on the west channel to raise the base elevation thereby forcing greater flows into the east channel. A rock sill structure flush with the channel bottom would be placed across the east channel to prevent the channel from degrading and becoming dominant.

The proposed drop structure on the west channel would be 1-2 feet above the channel bottom, potentially creating a hazard to floaters during low flow periods. The DFWP has agreed to place appropriate signing and has begun negotiations with the adjacent landowner for a portage route should it be necessary.

The DFWP endorses the project because it will serve to stabilize this portion of the Big Hole. Channel stabilization will contribute to maintenance and improvement of important blue ribbon fisheries, preservation of agricultural land, and protection of the riparian habitat. Support for the project has also been forthcoming from landowners and irrigators on both channels, Melrose residents, Beaverhead, Madison, and Silver-Bow County Commissioners, and local sportsman organizations.

#### FINANCIAL ASSESSMENT:

Construction cost estimates were obtained from contractors based on preliminary plans and specifications developed by Geomax. DFWP contributed approximately \$3,000 for the costs involved in field work and preparation of the preliminary design. DFWP has also committed \$2,500 to pay for a portion of the final design costs.

The applicant will contribute approximately \$600 to cover office rent, utilities, and other expenses. However, \$3,000 of the requested grant amount would be used by Headwaters RC&D for administration of the project. The town of Melrose, Beaverhead County, or adjacent landowners are not anticipating contributions to the project.



ENVIRONMENTAL ASSESSMENT:

If designed and constructed properly, this project should improve river bank stability and maintenance of the fishery habitat.

RECOMMENDATION:

Because this proposed river channel work is potentially disruptive, and the Big Hole River is a nationally recognized blue ribbon fishery, DNRC recommends that the proposal be reviewed by an independent party with suitable technical expertise. If the second opinion results in a consensus on the project, DNRC recommends a \$31,742 grant contingent upon DNRC approval of the scope of work and budget.

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APPLICANT NAME: Prairie County Conservation District

PROJECT/ACTIVITY NAME: Small-scale watershed demonstration of management practices to improve the quality of irrigation return flows and fertilizer use efficiency along the Powder River.

AMOUNT REQUESTED: \$68,991

OTHER FUNDING SOURCES AND AMOUNTS: \$23,079 - Montana State University

TOTAL PROJECT COST: \$92,070

PROJECT DESCRIPTION:

Prairie Conservation District, in cooperation with Powder River and Custer Conservation Districts, and Montana State University, is proposing to demonstrate alternative practices to area irrigators. The demonstration would show how to improve irrigation efficiency through irrigation scheduling and how to reduce salt and sediment accumulation through irrigation frequency management. Each of the three conservation districts, with the assistance of the Montana Cooperative Extension Service and Department of Plant and Soil Science, will establish a small-scale watershed demonstration at one location within each cooperating district. At each location, paired comparisons of various irrigation management practices will be installed on small basins, irrigated with Powder River water. Comparisons to be demonstrated will include demonstration of deficient, adequate, and excessive irrigation amounts. Actual measurements will be made of water quantity and quality returning to the Powder River and to the groundwater. These sites will be used to show irrigators within the participating districts some alternative practices and technology for improving irrigation

water management, water scheduling, and fertilizer management.

Specific objectives of the demonstration project are:

- 1) to demonstrate the potential economic and resource conservation benefits associated with improving irrigation and crop-decision management practices;
- 2) to improve the efficiency of use of irrigation water and/or reduce the use of the irrigation water;
- 3) to reduce sediment load in the Powder River by minimizing sediment in return flows; and
- 4) to demonstrate a reduction in the potential movement of nitrogen, phosphorus, herbicides, and pesticides into irrigation return flows.

At each of the demonstration site locations, actual measurements of irrigation water input versus output, sediment yields, chemical inputs versus losses, and crop yields will be made by Montana State University. To demonstrate the effectiveness of the alternative management practices, each conservation district will arrange an annual education meeting series. This series will include a winter seminar, a spring or summer field tour, a self-guided tour at each demonstration site, and a periodic newsletter to all farmers within the conservation district.

#### TECHNICAL ASSESSMENT:

Each demonstration site will be subdivided into smaller units which will be equipped with flumes and water-measuring devices at the upper and lower ends. Records of amount of incoming and outgoing water will be kept to quantify water management practices. Weather-recording will be done at each site daily by the participating cooperator. The sub-units will be used to demonstrate deficient, adequate, and excessive irrigation and related crop performance. Energy inputs, fertilizer additions, and fertilizer losses due to runoff and leaching will also be measured. Water samples will determine the amount of sediment pumped through irrigation equipment and sediment load and nutrient reductions of return flow as a result of the demonstration practices. Soil samples will be collected before and after each demonstration year, which will be analyzed for nitrogen, phosphorus, and other nutrients attributable to fertilizer additions.

The proposed demonstration project will provide a useful mechanism for increasing landowner awareness of effective irrigation water conservation practices. Designing and implementing an effective education program is the project's greatest challenge and will determine the long-term usefulness of the project.

#### FINANCIAL ASSESSMENT:

Cost estimates are realistic with grant funds being used for salaries \$35,512; contracted services \$10,800; supplies \$3,435; travel \$8,100; and equipment \$11,144. MSU's contribution will be

\$23,079, which consists of in-kind services and indirect costs.

ENVIRONMENTAL ASSESSMENT:

The intent of this project is to demonstrate practices for reducing the quantity of irrigation water and improving the quality of surface return flows to the Powder River. If alternative management practices are implemented by irrigators as a result of this project, the results should be environmentally beneficial.

RECOMMENDATION:

DNRC recognizes that the success of this project will be measured in terms of actual implementation of conservation practices by area irrigators. Dr. James Bauder, who has demonstrated his ability for similar educational programs, is encouraged to be directly involved with this project.

DNRC recommends a grant in the amount of \$68,991 contingent upon approval of scope of work and budget.

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APPLICANT NAME: Park Conservation District

PROJECT/ACTIVITY NAME: Park Conservation District Sediment Control Diversion

AMOUNT REQUESTED: \$49,715

OTHER FUNDING SOURCES AND AMOUNTS: \$1,285 Park Conservation District

TOTAL PROJECT COST: \$51,000

PROJECT DESCRIPTION:

The Park Branch Canal is a state-owned project providing irrigation water to 12,300 acres in the Paradise Valley south of Livingston. The headgate for this canal is located on a side channel of the Yellowstone River. Gravel deposition at the inlet of this side channel has been a chronic and perennial problem since the initial construction of the canal in 1937. In addition, the inlet channel was enlarged in 1959 to provide additional water for Paradise Canal, which shares the headgate works and the first 5 miles of canal. This enlargement increased the flow from the river and aggravated the gravel deposition problem.

Gravel deposition reduces flows into the side channel and eventually must be removed to provide sufficient irrigation water. The water users dredge gravel deposit and place the tailings on the adjacent river bank. Excavating the deposits from the inlet was needed only occasionally during the first 20



years, but with the increased flows associated with the Paradise Canal addition in 1959, the problem became more acute and required more frequent excavation. This maintenance practice is expensive, and in recent years more pressure has been put on the water users by environmental groups and government agencies who are critical of the maintenance practice and concerned with the associated environmental impact.

The water users have hired a consultant to perform a preliminary investigation into potential solutions to the gravel deposition problem and to prepare a grant application for final design and construction funding. The consultant interviewed sediment transport experts and ultimately evaluated three alternatives: a low head rock wier across the Yellowstone River, relocation of the side channel, or application of the Iowa vane concept. The Iowa vane concept was recommended and the project sponsor is requesting grant funding to design, construct, and demonstrate this innovative sediment control method.

The proposed sediment control method consists of a series of submerged steel vanes placed in the main stream of the Yellowstone River and extending in staggered rows across the mouth of the inlet channel. The vanes are oriented at an angle of 15 to 20 degrees to the direction of flow. The top of the vanes are set halfway between the bed and the water surface at the design flow. The design flow is defined as the discharge at which transport of sediment along the bottom of the channel begins.

The submerged vanes have two functions in this application: (1) to break up the secondary current of the channel cross-over, and (2) to eliminate the deposition of sediment in the inlet to the side channel. The first of these is accomplished by the orientation of the vanes with respect to the inlet. The second is achieved by a combination of physically deflecting the moving sediment and by accelerating the flow on the side of the vane facing the center of the stream. The accelerated flow causes the bed to scour on that side of the vane. The scoured material is transported downstream parallel to the vane instead of into the inlet.

A schedule for observing the physical performance of the vanes and their effect on the configuration in the channel inlet for two runoff periods will be established. A photographic log and pertinent physical measurements will be recorded. This data will be used to assess the design of the submerged vanes.

#### TECHNICAL ASSESSMENT:

The use of submerged vanes to control sediment deposition and river bank erosion has been developed and model tested at the Iowa Institute of Hydraulic Research by Dr. Jacob Odgaard, who has also supervised the installation of these vanes at two sites in Iowa. One of the sites involved sediment deposition at a power plant intake. The vanes were installed in March of 1985 and so far have eliminated the need to dredge the intake annually.

Dr. Odgaard was asked specifically about the use of the vanes

with gravel of the size found in the Yellowstone River. He indicated that the vanes should work just as well as with the finer material found on the two installations cited. In addition, the installation on the Nishnabotna River has been subjected to severe ice cover in the past two winters and has not been damaged.

Past application of the Iowa Vane concept included considerable modeling to establish the vane configuration. This effort reduced the risk of design failure considerably. In the proposed project, no such modeling will be performed and the tools for establishing the proper vane configuration are limited. The project sponsor's consultant intends to coordinate with Dr. Odgaard and Dr. Bob Brown of MSU (an authority on granular solid modeling) to reduce the risk associated with the lack of modeling.

If successful, this method of sediment control may be applicable to many irrigation diversion structures across the state as well as pump inlets.

#### FINANCIAL ASSESSMENT:

The total project cost is \$51,000 and is distributed as follows: engineering \$11,000, construction \$33,250; and contingencies \$5,465. Presently, the department has no experience with an installation of this particular type and cannot assess cost. However, the costs do not seem flagrantly high or low.

#### ENVIRONMENTAL ASSESSMENT:

If successful, this project will reduce the need for periodic excavation of gravel deposits and the related disturbances to the soil, water, and vegetation.

If the project is not successful, and results in significant damage to the resource (a blue ribbon fishery), provisions should be made for the removal of the vanes.

The vanes may present a hazard to recreationists and efforts will have to be made to reduce or eliminate this hazard. The construction activity associated with this project will have a negative impact. No other environmental impacts are known.

#### RECOMMENDATION:

A grant of 50 percent of construction costs up to \$24,857 is recommended contingent on DNRC approval of the project scope of work and budget.

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APPLICANT NAME: Carbon Conservation District

PROJECT/ACTIVITY NAME: Rushwater Creek Erosion Control

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS:    \$83,340 - ACP Pooling Agreement  
   \$5,000 - Carbon County  
   \$22,780 - Mutual/Bridger Ditch Companies

TOTAL PROJECT COST:    \$211,120

PROJECT DESCRIPTION:

Rushwater Creek is a small intermittent stream which flows into the east side of the Clarks Fork of the Yellowstone River southeast of Bridger. During the irrigation season, both the Mutual and Bridger Irrigation Ditches spill water into the lower section of Rushwater Creek, causing excessive erosion of the creek channel. In places, the creek channel has eroded to a depth of about 20 feet. The bank erosion and degradation of the channel bottom have and are creating maintenance problems to a county road bridge and railroad crossing.

Carbon Conservation District intends to correct the present situation with the construction of a concrete control structure placed below the Mutual Ditch spillway. From the county road to the confluence with the Clarks Fork of the Yellowstone, ten rock-drop structures will be installed to control the gradient. All disturbed areas will be revegetated.

TECHNICAL ASSESSMENT:

Practically every open canal irrigation system has a terminal wasteway problem. There can be little doubt that any erosion control efforts will be worthwhile.

The Rushwater Creek problem has received attention and study by the SCS at least as far back as 1973. Because of the potential threat to the county road and railroad crossing, and because the erosion problem is accentuated by the wasting of water from two major irrigation supply ditches, Rushwater Creek is identified as the worst wastewater-caused erosion problem in Carbon County.

One important aspect of reducing the amount of water being wasted into Rushwater Creek would be better management of water in the ditches. Presently, the ditches run at full capacity and any excess water is wasted into Rushwater Creek. The applicant intends to develop a water scheduling plan in hopes of reducing the amount of water that is wasted.

The Soil Conservation Service has developed preliminary engineering plans for the control structures and drop structures to be constructed. All final designs and specifications will be prepared by the SCS. The preliminary plans look like a feasible solution for prevention of further degradation of Rushwater Creek.

All corrective action to be performed on Rushwater Creek will take place in the lower 1.5 miles of the creek, from the county road crossing to the confluence of the Clarks Fork of the Yellowstone River.



#### FINANCIAL ASSESSMENT:

Total costs for this project are estimated at \$211,253. An ASCS-ACP pooling agreement will tentatively provide \$83,343. Carbon County will provide \$5,000 and the ditch companies each will contribute \$10,205. The Mutual and Bridger Ditch companies will assess its water users for their portion with combined shares of 5720 which would increase the assessment by \$3.54 per share. Assuming a grant of \$100,000 from DNRC, and ACP funds of \$83,343, the combined cost-share rate for the project would be 87 percent.

Construction cost estimates are broken down as follows:

a) Excavation and shaping - 25,700 c.y. @ \$2.00/c.y.	=	\$ 51,400
b) Rock for drops - 5721 c.y. @ \$20/c.y.	=	114,400
c) Gravel bedding - 1260 c.y. @ \$10/c.y.	=	12,600
d) Reinforced concrete box - 7.0 c.y. @ \$500/c.y.	=	<u>3,500</u>

ESTIMATED CONSTRUCTION COSTS	\$181,900
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#### ENVIRONMENTAL ASSESSMENT:

The major benefit as a result of this project will be reduced erosion of Rushwater Creek channel and reduced sediment leading into the Clarks Fork Yellowstone River. The applicant has calculated that 6,758 tons of sediment are produced each year. Although sediment production should be greatly reduced, any detectable improvement to water quality in the Clarks Fork will be negligible due to large sediment loads present in the river.

#### RECOMMENDATION:

Improved water management is an important aspect of this project. DNRC recommends a grant of up to \$100,000 contingent upon the development of a water management plan by the applicant, DNRC approval, and successful implementation of the plan for one year. The grant is also contingent upon DNRC approval of scope of work and budget.

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APPLICANT NAME: Private Water and Sewer Association

PROJECT/ACTIVITY NAME: Wastewater Pond Effluent Irrigation  
System

AMOUNT REQUESTED: \$29,558



OTHER FUNDING SOURCES AND AMOUNTS:    \$15,000 - Eastgate Village  
Water and Sewer Association -  
(user fees)  
\$75,044 - Eastgate Village  
Water and Sewer Association

TOTAL PROJECT COST: \$119,602

PROJECT DESCRIPTION:

The Eastgate Water and Sewer Association operates and maintains the water and sewer system serving Eastgate Village, a residential development located one mile east of East Helena. The wastewater treatment system consists of two aerated ponds followed by effluent irrigation on nearby farm land.

A dispute with the landowner of the farm land leased by the Association has resulted in the termination of the lease. Subsequently, the Association has investigated three treatment alternatives: total retention ponds, rapid infiltration ponds, and wastewater effluent sprinkler irrigation. The total retention ponds are too expensive and the rapid infiltration ponds are environmentally unacceptable. Therefore, the installation of an effluent sprinkler irrigation system is the preferred wastewater treatment method.

For the purpose of effluent irrigation, the Association has purchased 80 acres of farm land next to the existing wastewater ponds and leased another 80 acres. A local farmer has agreed to farm the land and will be responsible for irrigation and associated costs. The Association will also be provided a share of crop production. The existing center pivot owned by the Association will have to be expanded and miscellaneous equipment purchased. Also, because the location of the land provides an inadequate buffer between the effluent and public facilities, the Department of Health and Environmental Sciences is requiring chlorination. This grant proposal is requesting cost-share for the purchase and installation of the irrigation and chlorination equipment.

TECHNICAL ASSESSMENT:

Alternate treatment methods and irrigation systems were investigated on a reconnaissance level and the decisions made appear to be consistent with the analysis. The Soil Conservation Service has investigated the soils and provided some technical assistance with equipment sizing. In addition, an irrigation equipment supplier has assisted with equipment sizing. The analysis is based on sound engineering principles and standards and is adequate for this type of work. The Association has coordinated with the Department of Health and Environmental Sciences (DHES) and approval of plans and specifications should not be a problem. However, final plans and specifications have not yet been approved by DHES. A licensed professional engineer will be hired to inspect equipment installation to ensure it is done properly.

FINANCIAL ASSESSMENT:

The 80 acres of land have been purchased for \$64,000 with the help of a \$60,000 loan from the Lewis & Clark Capital Development Fund and \$4,000 from the Association's existing budget. The remainder of project costs (\$55,602) will be provided for by this grant (\$29,558) and Association user fees (\$26,044).

Budgeted project costs are as follows: contract administration \$1,000; project inspection \$705, equipment \$29,656; materials \$16,509; land purchase \$64,000; and contingencies \$7,732. Equipment and material costs are supported by acceptable bids. Present user fees for Eastgate residents are \$13 per month for water and \$14 per month for sewer.

ENVIRONMENTAL ASSESSMENT:

Project installation will have limited temporary adverse environmental impact due to land disturbances.

RECOMMENDATION:

A grant of 25 percent of the total project cost up to \$29,558 is recommended contingent on DNRC approval of the project scope of work and budget.

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APPLICANT NAME: Carbon Conservation District

PROJECT/ACTIVITY NAME: Rock Creek Water Distribution

AMOUNT REQUESTED: \$61,000

OTHER FUNDING SOURCES AND AMOUNTS: \$60,000 - Individual Water Users  
\$1,100 - Carbon CD

TOTAL PROJECT COST: \$122,100

PROJECT DESCRIPTION:

Carbon Conservation District is proposing to assist ditch companies, ditch groups, and individual water users to construct measuring structures at or near headgates for the purpose of measuring their permitted flows into their ditch system. With the grant funds, the CD will assist with the design and installation and provide 50 percent of the cost of the measuring structures.

Rock Creek water was decreed in 1903. In most years, Rock Creek does not have sufficient water to satisfy all the decreed rights. A court order was issued establishing a deadline of May 1, 1989 by which time all diversions from Rock Creek must have water measuring structures installed. There are approximately 142 diversions in the Rock Creek drainage. To date, about one third of the headgates have measuring structures installed during

renovation construction with ACP cost-share.

The CD believes that through the availability of assistance for the measuring structures, they will be able to encourage irrigation water management, ditch consolidation and system reorganization where appropriate. For the purpose of this grant request, only the measuring structures would be cost-shared. If additional work is required, other funding sources, such as ASCS-ACP, SCS Great Plains, and private landowners, would be used.

The main purpose of this project is to assist the water commissioner in the proper allocation of irrigation water as decreed by the court.

#### TECHNICAL ASSESSMENT:

An increasingly important need exists in Montana for improvements in irrigation water management and equitable distribution of the water based on decreed water rights. During most years, Rock Creek is chronically short of water to satisfy permit holders. A water commissioner is working in the Rock Creek drainage, but the proper allocation of water is complicated by the lack of accurate, reliable measuring devices. According to the water commissioner, the court-ordered date of May 1, 1989 may be extended should this grant request be approved.

The Soil Conservation Service will provide the technical assistance for design and installation of the measuring structures.

#### FINANCIAL ASSESSMENT:

The cost of the measuring structures, in most cases Parshall flumes, will average between \$800-1000. ACP cost-share funding is not allowed for these structures unless they are installed in conjunction with irrigation structure renovation or irrigation system reorganization. With the CD being able to offer financial assistance, it is hoped that diversions could be consolidated in some cases, and the CD will have control over proper installation of the structures.

#### ENVIRONMENTAL ASSESSMENT:

The environmental effects of this project will be insignificant, except for short-term increased turbidity during construction. With improved water management, long-term benefits to the Rock Creek drainage streams may occur. It is not possible to assess potential benefits at this time.

#### RECOMMENDATION:

DNRC recommends a grant of up to \$30,000 to be used as a 25 percent cost-share for each measuring structure installed. The grant is contingent upon the provision that the court-ordered deadline of May 1, 1989 for the installation of the measuring devices is extended, and upon DNRC approval of the scope of work and budget.



APPLICANT NAME: Huntley Project Irrigation District

PROJECT/ACTIVITY NAME: Main Canal Measuring and Flow Control

AMOUNT REQUESTED: \$65,614

OTHER FUNDING SOURCES AND AMOUNTS: \$22,922 - Huntley Project  
Irrigation District

TOTAL PROJECT COST: \$88,536

PROJECT DESCRIPTION:

The Huntley Project Irrigation District, located 10 miles northeast of Billings, is in the process of upgrading its irrigation facilities to improve water management. The district has rehabilitated water measurement devices at the head end of all distribution laterals, purchased portable measurement devices, and is presently replacing antiquated distribution control gates. However, the main canal system has no means of accurately measuring the amount of water diverted or how much water is in any portion of the canal. As part of its ongoing effort to improve water management, the district is requesting grant funding to purchase materials and equipment required for the installation of a Supervisory Control and Data Acquisition System (SCADA). This system will automate the control of diversion gates and one main canal waste way gate and sense water surface elevations at these same locations and another wasteway location. Telemetry equipment will transmit the data to the supervisory control computer at the central office and allow for central office control of motorized gates. The district will provide for contract administration, project design, and installation. The DNRC grant will purchase equipment and materials only.

The irrigation system was built by the Bureau of Reclamation and began operation in 1908. The project serves 524 individual landowners and 27,450 acres, diverts approximately 500 cfs of Yellowstone River water (156,000 A.F. annually), and operates 260 miles of unlined earth canals.

TECHNICAL ASSESSMENT:

The present situation requires that the canal be filled based on an educated guess to ensure an equitable distribution. This situation has resulted in higher than required diversions and wasteway spills. The capability to measure water to a finite degree at the diversion and other locations within the system will allow the district to maintain an equitable distribution without excessive canal filling. This will conserve water and reduce wasteway spilling and the associated chemical and sediment pollution. The district anticipates a five percent

reduction in diversion which is credible for typical canal operation in Montana.

The district has not yet selected the actual equipment intended for purchase, but has contacted manufacturers and is aware of what equipment is available. The equipment is standard and installation should not be a problem. This type of system has been installed on other Montana irrigation systems and has performed satisfactorily.

FINANCIAL ASSESSMENT:

The proposed cost of equipment and materials is realistic (\$65,614). The cost of labor for installation, project design, and contract administration will basically be in-kind contributions of the district (\$22,922).

Water users now pay \$18 per acre for operation and maintenance and \$.75 for construction costs. The water users and the board of directors do not see any opportunity in the near future to raise user fees and, therefore, feel a grant is their only opportunity for installation of the proposed system.

ENVIRONMENTAL ASSESSMENT:

Project installation will have a very limited impact on the environment. The water conservation and reduced irrigation drainage will have a positive impact on the environment.

RECOMMENDATION:

A grant of 50 percent of project costs up to \$44,268 is recommended contingent on DNRC approval of the project scope of work and budget.

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APPLICANT NAME: Cascade County - (Sun Prairie) Village Water and Sewer Association, Inc.

PROJECT/ACTIVITY NAME: Sun Prairie Village Wastewater Treatment and Collection Improvements

AMOUNT REQUESTED: \$100,000 Grant

OTHER FUNDING SOURCES AND AMOUNTS: \$313,377 - CDBG or FmHA Funds  
\$684,038 - EPA Grant  
\$162,000 - DNRC Loan  
(1986-87)

TOTAL PROJECT COST: \$1,259,415

PROJECT DESCRIPTION:

Sun Prairie Village is a rural subdivision located along the

Sun River 6.3 miles west of Great Falls and has 590 lots of which 350 were occupied as of May 1988. The subdivision is serviced by a central water and sewer system constructed in 1976 by the developer. In March of 1977, Cascade County created RSID No. 26 and purchased the improvements from the developer. The wastewater facilities include a gravity collection system, two lift stations, and treatment facilities consisting of a two-cell lagoon with an adjacent 80 acre spray irrigation site.

On March 5, 1985, the south embankment of lagoon cell 2 collapsed and consequently the Department of Health and Environmental Sciences (DHES) brought action against the association to make permanent repairs. The dikes were originally constructed of poorly compacted expansive clays, and a lack of interior erosion protection resulted in serious sloughing of the embankment. In addition, the wastewater and the land upon which it is to be disposed are not suitable for irrigation. The wastewater flows are also greater than the design flows, and the collection and treatment systems were poorly designed and constructed.

Sun Prairie Village Water and Sewer Association has an outstanding complaint pending in District Court to affect improvements to the wastewater facilities to bring them into compliance with state law. A compliance schedule has been proposed by DHES and Sun Prairie Village will have no choice but to adhere to this schedule. This compliance schedule will reflect the Board of Health's decision on a discharge permit variance as well as information included in the yet to be completed facility plan. The alternatives to solve the problem will be addressed in the facility plan.

#### TECHNICAL ASSESSMENT:

The Sun Prairie Village Water and Sewer Association has hired an engineer to prepare a facility plan addressing the project, its problems, and a number of alternative solutions. The association has been issued a non-degradation permit to discharge the effluent to the Sun River. The association then filed and received an appeal for a variance from the Board of Health to modify their existing discharge permit to allow for a discharge of effluent to the Sun River meeting secondary treatment standards. This variance will allow for the association to select from two discharge alternatives identified in the preliminary facility plan. The facility plan will address the most appropriate and technically feasible alternative to solve the problem addressed. All of the alternatives that have been addressed in the preliminary facility plan are technically feasible and should achieve the desired results. The WQB will review and approve the final alternative selected in the final facility plan. The WQB agrees that the project is urgently needed and will review and approve the design prior to construction.

#### FINANCIAL ASSESSMENT:

The total project costs of \$1,259,415 were based on the Board of Health issuing a variance to the discharge permit allowing a



discharge of effluent to the Sun River meeting secondary treatment standards. The alternate proposal will repair the lagoon dikes, line the lagoon, replace the aeration system, construct chlorination facilities, and pump the effluent south to the Sun River. The total project costs are estimated at \$1,259,415 of which \$1,007,532 is for construction and contingencies, and the balance is for engineering, inspection, legal, and administration costs.

The applicant has requested a \$100,000 grant from DNRC which would be used in conjunction with a \$162,000 DNRC loan authorized in the 1986-87 legislative session. The association is eligible to receive 55 percent grant funding through the EPA Construction Grants Program which amounts to \$684,038. The remaining \$313,377 of funds will be requested from the Community Development Block Grant Program or the Farmers Home Administration. The estimated project costs appear to be reasonable and the most cost-effective solution will be selected. Monthly user charges for sewer are estimated to be \$6.73 presently and would increase to between \$15.97 to \$21.49 per month per user depending upon the funding scenario.

#### ENVIRONMENTAL ASSESSMENT:

Construction of the improvements will satisfy the Montana Department of Health and Environmental Sciences's order to affect corrective measures to prevent the uncontrolled discharge of untreated wastewater into state waters and bring the discharge into compliance with Sun Prairie's discharge permit. Most importantly, construction of the facilities will satisfy the court and terminate the court proceedings.

A piped discharge, either gravity-fed or pumped, of treated wastewater will theoretically degrade the Sun River but will not cause it to be degraded below legislated water quality standards. Nor will this discharge preclude the water in the Sun River from further beneficial use.

Short term impacts will result from construction techniques. However, these impacts are expected to be minimal and may be mitigable.

#### RECOMMENDATION:

A grant of 25 percent of the total project costs up to \$50,000 and a loan of up to \$150,000 is recommended contingent upon Sun Prairie Village forming a county water and sewer district and securing the remainder of project funding. The existing 1986-87 loan authorization of \$162,000 will not be reauthorized to accommodate this grant. If grant funding is not available for this project, the district may request a loan of up to \$200,000. Any reduction in the scope will result in a proportionately smaller grant and should not affect the priority improvements. DNRC must also approve the project scope of work and budget.



APPLICANT NAME: Private Applicant

PROJECT/ACTIVITY NAME: Gravity Sprinkler Project

AMOUNT REQUESTED: \$32,023 Grant; \$75,071 Loan

OTHER FUNDING SOURCES: \$21,000 - ASCS Long-Term Agreement

TOTAL PROJECT COST: \$128,094

PROJECT DESCRIPTION:

A private applicant from St. Ignatius is requesting funds to be used to convert 510 acres from flood irrigation to gravity sprinkler irrigation. The project is located approximately 3 miles east and 2 miles north of St. Ignatius. The source of irrigation water is Ashley Creek.

The applicant began converting to gravity sprinkler irrigation in 1980 with the installation of steel pipeline and 3 wheel line sprinklers. Under this application, 13,300 feet of buried mainline will be installed and an additional 4 wheel line sprinklers will be purchased. The total project will require 13 wheel lines for completion. The remaining 6 wheel lines will be purchased at a future date by the applicant.

The present irrigation system delivery consists of open canals and ditches, which have a significant amount of seepage and loss by evaporation. With the proposed gravity sprinkler system most of the water control structures and all open canals could be abandoned. Water use efficiency would increase from 25 percent to approximately 70 percent. Presently, 15 cubic feet per second of water is diverted to flood irrigate the 510 acres. When the gravity sprinkler system has been totally completed, required diversion will be reduced to approximately 5 cubic feet per second. Instream flows in Ashley Creek should increase by 65 percent.

TECHNICAL ASSESSMENT:

Soils in the project area are primarily McDonald silt loams, which are well suited for irrigation. Slopes range from 5 to 9 percent, and elevations are from 3,100 to 3,800 feet. The growing season is approximately 120 days.

A plan has been prepared by the Soil Conservation Service. The SCS has also performed a preliminary analysis and determined the project to be technically feasible. Final design, cost estimates, and specifications will be reviewed prior to funding. Final design and installation of the pipelines will meet or exceed SCS specifications.

FINANCIAL ASSESSMENT:

The SCS estimates costs of \$89,358 for the materials and installation of the buried mainline and \$24,000 for the 4 wheel

lines. These costs appear to be reasonable and adequate.

ENVIRONMENTAL ASSESSMENT:

Environmental effects of this project should be beneficial due to increased irrigation efficiency and increased stream flows in Ashley Creek.

RECOMMENDATION:

DNRC recommends a grant of 25 percent of the project cost up to \$32,023 contingent upon DNRC approval of scope of work and budget, and also contingent upon the applicant's ability to finance the remaining costs of the project.

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APPLICANT NAME: Greenfields Irrigation District

PROJECT/ACTIVITY NAME: Lateral Rehabilitation

AMOUNT REQUESTED: \$43,082

OTHER FUNDING SOURCES AND AMOUNTS: \$129,246 - Greenfields  
Irrigation District

TOTAL PROJECT COST: \$172,328

PROJECT DESCRIPTION:

The Greenfields Irrigation District proposes to rehabilitate 2.22 miles of open ditch located 4 miles north of Fairfield near Freezeout Lake. The objective of the project is two-fold: 1) to conserve water being lost through ditch seepage, thereby improving water delivery service to farms; and 2) to replace 35 water control structures which have deteriorated.

The use of concrete ditch lining in conjunction with buried pipe will eliminate the need for 23 drop structures which require considerable maintenance. The system is expected to reduce seepage losses by 5 cfs, which amounts to annual water savings of 1,300 acre-feet. Water that is saved can be used to avoid crop stress in adjacent areas brought about by water shortages. The improvements are also expected to reduce recharge to nearby saline seep areas and to lower silt accumulations to the Freezeout Lake Game Management area.

TECHNICAL ASSESSMENT:

The existing canal lateral was constructed in 1935 and is in need of reconstruction. The proposed improvements are based on solid technology and are supported by many years of rehabilitation experience by the district.

Although the current maintenance costs associated with the open ditch were not documented in the application, the applicant

indicated that several drop structures have failed in the past. The district should incur very low maintenance costs with the new system. The water conservation estimates also appear reasonable.

FINANCIAL ASSESSMENT:

The project budget includes \$16,111 for engineering and administration; \$26,630 for labor; \$26,630 for equipment; \$79,888 for materials; and \$23,069 for contingencies. DNRC is requested to cost share 25 percent in each of these categories.

The district has an annual operating budget of about \$1.5 million dollars. Its annual assessments total \$14.54 per acre.

ENVIRONMENTAL ASSESSMENT:

Short-term impacts from the project will include increased erosion and sedimentation. Some wildlife habitat will be lost due to the canal lining and conversion to buried pipe.

RECOMMENDATION:

A grant of 25 percent of project cost up to \$43,082 is recommended contingent on DNRC approval of scope of work and budget.

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APPLICANT NAME: Sheridan County

PROJECT/ACTIVITY NAME: Carroll Dam Feasibility Study

AMOUNT REQUESTED: \$84,500

OTHER FUNDING SOURCES AND AMOUNTS: \$5,500 - Sheridan County

TOTAL PROJECT COST: \$90,000

PROJECT DESCRIPTION:

The original Carroll Dam was constructed as a WPA project in 1937-39. It was used for fishing and recreation until it was washed out by a flood in 1946. Since that time, Sheridan County has retained possession of the site containing 280 acres of rangeland. Over the intervening years various groups have promoted reconstruction of the reservoir, and in 1984 a steering committee was formed by the county to pursue development of the project. The committee selected an engineering firm to provide a preliminary study, feasibility study, scope of work, and cost estimates. In March of 1985 the City of Plentywood and Sheridan County filed an application for water rights and an environmental review was conducted. The water right permit has been denied by DNRC, but is presently being appealed administratively. In 1986 the county contracted for a county-wide recreation study and survey which strongly supported the proposed project, and the



issue was placed on the ballot and was supported by a majority of the voters in the county. In 1988 the county purchased a 40 acre tract of BLM land which is included as part of the proposed project.

The project sponsor, encouraged by the preliminary study results, is requesting grant funding to pursue a more detailed feasibility study. The proposed feasibility study would prepare an application for hazard determination under Montana dam safety laws; complete a design report per DNRC dam safety guidelines; develop a reservoir operation program; estimate project construction costs; perform topographical surveys of the dam sites and borrow areas; and perform legal surveys defining the required land acquisition. The design report discussed above would include dam characterization, rating charts, geologic and geotechnical investigation and analysis, hydrology and hydraulic analysis, and drainage analysis. The objective of this feasibility study is to provide Sheridan County with the necessary information to proceed with acquiring the required easements, property, and funding for construction. The project sponsor suggests that only final plans and specifications would have to be prepared after the proposed effort is complete.

#### TECHNICAL ASSESSMENT:

The water right permit application for this project has been denied and the denial has been appealed by the applicant. Final resolution of this issue is not anticipated sooner than the fall of 1988 and could be longer depending on the outcome of the appeal and extent to which the applicant pursues the issue.

About 50 percent of the landowners directly effected by the proposed construction of Carroll Dam support the effort. The remaining landowners oppose the project to varying degrees with one landowner being very opposed. Condemnation is anticipated in this case. The majority of the people in the county support the project, but what level of financial support the public will accept is unclear (see Financial Assessment).

The county intends to operate and maintain the dam and reservoir, but have not outlined an O&M plan. In addition, annual O&M costs have not been estimated and an O&M cost estimate is not presently included in the proposed scope of work for the feasibility study.

In general, the proposed scope of work is not sufficiently detailed. It does not describe such things as design standards to be used, water quality and fishery issues, or design approach. A more detailed scope of work should be developed prior to project funding.

The moderate hazard classification in the preliminary study is based on North Dakota dam safety guidelines and may be a high hazard classification by Montana dam safety guidelines. The preliminary breach analysis indicates that the farmhouse approximately 3 miles downstream of the dam may be inundated and loss of life may be possible. The preliminary cost estimates were not based on Montana high hazard classification standards and the preliminary cost estimates may not be accurate. Estimated costs vary between \$1.4 and \$1.6 million dollars for

the construction of the dam and reservoir.

The Town of Plentywood has completed its municipal water supply study and estimated costs of approximately \$1,000,000 to build facilities to use Carroll Dam water. Based on this, the project sponsor indicated it is very unlikely that a municipal water supply will be developed using Carroll Dam water.

FINANCIAL ASSESSMENT:

Feasibility study costs are based on quotes from the engineering firm. The total cost, based on the proposed scope of work, is \$90,000. Project costs will be distributed as follows: \$5,500 for contract administration (Sheridan County); \$40,000 for project design and services; \$35,000 for geotechnical investigation and analysis; and \$9,500 for topographic and legal surveying. The engineering firm may not have allowed enough in its budget for geotechnical investigation and analysis, much of which will be subcontracted. Presently, the county anticipates grants for construction, with a 2 year mill levy covering the remaining costs. O&M costs are not estimated nor is a revenue source identified. The county may form a recreation board to operate the dam and may try to pass a mill levy to cover O&M expenses.

ENVIRONMENTAL ASSESSMENT:

The geotechnical investigation may result in some short term land disturbance. The construction of the dam and reservoir would not threaten endangered wildlife or plant species. Inundation of some wildlife habitat and plant species would result. Creek water quality would probably improve. There are no known historical or archaeological sites at Carroll Dam.

RECOMMENDATION:

A grant of \$84,500 is recommended contingent on DNRC approval of the project scope of work and budget and resolution of the water rights issue.

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APPLICANT NAME: Town of Dutton

PROJECT/ACTIVITY NAME: Streambank Stabilization

AMOUNT REQUESTED: \$98,000

OTHER FUNDING SOURCES AND AMOUNTS: None

TOTAL PROJECT COST: \$98,000

PROJECT DESCRIPTION:

Previous efforts by the Town of Dutton to locate an alternate water source have not been successful and the town is now



focusing its effort on maintaining the existing facilities. Therefore, the town is requesting grant funding to riprap 1,400 feet of river bank along the Teton River. The purpose of this project is to protect the town's only water source (a 33 foot wet well) from the encroaching river. Comparison of aerial photographs from 1951 to 1983 has established a lateral migration rate of 4 to 6 feet per year. Assuming a constant migration rate, the river would reach the pump house in approximately 15 to 20 years. In addition, the town is concerned that the well water quality will be degraded by direct interaction with the surface water as the river approaches the well.

The alternatives investigated include rerouting the river channel, steel sheet piling, and riprap bank protection. Engineering studies and the SCS have recommended riprap bank protection. The SCS will perform the design, but will not prepare the bid package, solicit contractors, or inspect project construction.

#### TECHNICAL ASSESSMENT:

The lateral migration of the river toward the water supply facilities is fairly well documented, but water quality degradation due to surface water interaction with the well is not.

Properly designed and installed, rock riprap will stabilize the bank and provide adequate protection of the facilities, but will not guarantee protection as long as the facilities are located in the floodplain. The SCS has adequate resources to perform the design, but project installation is at risk due to the SCS not providing inspection services. The town anticipates using a local person, instructed by the SCS, to inspect project construction. Consideration should be given to hiring a qualified inspector.

Bank stabilization may result in accelerated erosion and channel alteration both upstream and downstream of the stabilized bank. Some reviewers have suggested additional surveys both upstream and downstream of the stabilized bank to establish baseline data for future analysis of the impact of the proposed project.

Previous efforts to locate an alternate water source have been adequate. The only information that appears to be lacking is a comparison of the cost to stabilize the bank with the cost of drilling a new well in the immediate vicinity of the existing well and supply pipeline, but away from the threat of the river. The department recognizes that this will not improve the water quality of the supply, but may be more cost effective and provide a higher degree of protection. In addition, it eliminates alterations to the river and associated changes in river mechanics.

#### FINANCIAL ASSESSMENT:

Because reserve accounts have been exhausted with recent pump and water tank repair and the average water user pays approximately \$23 per month, the town believes it does not have the ability to finance this project and is requesting 100 percent

financing.

The budget presented includes no breakdown of project costs, but the estimated cost of \$98,000 seems consistent with similar projects. The town intends to cover project administration costs.

Previous engineering studies indicate protection of the existing water source and adding treatment facilities to be more cost-effective when compared to developing a new water source. The only exception to this statement may be developing a new well in the immediate vicinity of the existing well, but away from the river.

ENVIRONMENTAL ASSESSMENT:

No adverse impacts to fish and wildlife are anticipated, but the potential exists for stream channel alterations due to the stabilization of two river banks.

RECOMMENDATION:

DNRC recommends a grant of 25 percent up to \$24,500 contingent on DNRC approval of the scope of work and budget. In addition, the town is to demonstrate that the proposed project is more cost effective than drilling a new well away from the threat of the river in the immediate area of the existing well and supply pipeline.

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APPLICANT NAME: Town of Poplar

PROJECT/ACTIVITY NAME: Water Treatment Facility

AMOUNT REQUESTED: \$50,000

OTHER FUNDING SOURCES AND AMOUNTS:

\$150,000	- Town of Poplar
\$320,000	- Indian Health Service
\$250,000	- Economic Development Administration
\$80,000	- Fort Peck Housing Authority

TOTAL PROJECT COST: \$850,000

PROJECT DESCRIPTION:

Poplar, located along the Missouri River on the Fort Peck Indian Reservation, has a population of about 1,000. However, the town provides basic municipal services to an additional 2,000 tribal users located adjacent to town for a total service population of 3,000. Poplar received a DNRC loan in 1985 to

upgrade the water system which presently consists of three wells, several thousand feet of 12-inch, 8-inch, 6-inch, and 4-inch diameter distribution lines, and a 100,000 gallon and a 500,000 gallon elevated storage reservoir. High levels of iron and manganese exist in the groundwater obtained from the three wells. Although not an immediate health hazard, the water has foul odors, causes iron build-up in the water mains, and stains plumbing fixtures, clothing, and buildings.

The proposal is to construct an iron and manganese removal facility to be used along with the existing facilities. The proposed facility will remove iron and manganese from the groundwater by adding potassium permanganate and by pressure green sand filtration. The treated water will be used by the citizens of Poplar, the tribal members living around the community, and the industrial park. The project will provide a water supply which will cut down on maintenance costs to the town and will reduce staining of fixtures in the homes of the users.

#### TECHNICAL ASSESSMENT:

In 1987, Poplar hired a consulting engineering firm to evaluate the capital outlay and the operation and maintenance costs associated with two methods of water treatment for the town and the surrounding area. The two methods evaluated were: (1) removal of the iron and manganese from the existing groundwater source; and (2) riverwater filtration. The study adequately analyzed these two methods and determined that treatment of the iron and manganese was the most cost-effective alternative. Iron and manganese are common in the groundwater in northeastern Montana and the treatment proposed is appropriate, technically feasible, and should produce the desired effects.

The final design of the proposed project will be reviewed and approved by the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences prior to beginning construction. Conceptually, the WQB agrees with the project proposed, and has ranked it on the lower end of its project priority list.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$850,000 with \$717,000 for construction and contingencies and the balance for engineering, legal, and administrative costs. The applicant has requested a \$50,000 DNRC grant. The town will provide \$150,000 in local funds and will request a \$320,000 grant from the Indian Health Service, a \$250,000 Economic Development Administrative grant, and an \$80,000 Fort Peck Housing Authority grant to complete the funding.

The cost estimates appear realistic and reasonable, and it appears as though this is the most cost-effective alternative available. Present rates are about \$27.00/user/month.

#### ENVIRONMENTAL ASSESSMENT:

The only adverse impacts that will result from this project are those minor, short-term effects typically associated with construction projects. Positive impacts include water quality



enhancement by reducing the iron and manganese, water and energy conservation because of reduction in pumping costs due to less main line flushing, and a reduction in property damage related to the staining effects of the iron deposits.

RECOMMENDATION:

A grant of up to \$50,000 is recommended contingent upon Poplar securing the remainder of project funding to complete the project and on DNRC approval of the project scope of work and budget. If grant funding is not available for this project, Poplar may request a loan for up to \$50,000. Any reduction in the scope of work will result in a proportionately smaller grant and should not affect priority improvements.

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APPLICANT NAME: City of Troy

PROJECT/ACTIVITY NAME: Water System Improvements

AMOUNT REQUESTED: \$28,950 Grant

OTHER FUNDING SOURCES AND AMOUNTS: \$1,000 - City of Troy  
\$47,640 - Montana Department of  
Highways

TOTAL PROJECT COST: \$77,590

PROJECT DESCRIPTION:

Troy is a small town of 1,088 people located along the Kootenai River in northwestern Montana, 18 miles west of Libby near the Idaho border. The city's original municipal water system was constructed in the 1930s with steel line replacing the original wooden lines in the 1950s. The system is operating adequately and is not in need of any major repairs. The proposed project would remove, replace, and relocate those portions of the municipal water system located within the State Highway right-of-way to accommodate the reconstruction of U.S. Highway 2 through the City of Troy. The objective is to relocate those municipal water facilities that are in direct conflict with the highway reconstruction and to upgrade the necessary water system components before highway reconstruction to insure a safe and maintenance-free water system within the construction boundaries.

The project consists of: (1) removal and relocation of fire hydrants; (2) removal and replacement of service lines to property abutting the right-of-way; (3) replacement of water mains in conflict with the highway drainage system; (4) adjustment of the water valve boxes due to highway

reconstruction; and (5) the removal and replacement of the Callahan Creek water main crossing to serve the southern one-third of town.

#### TECHNICAL ASSESSMENT:

All of the proposed improvements to the water system are located within the right-of-way of U.S. Highway 2. These improvements will be necessary to accommodate the reconstruction of the highway. The remaining water distribution system is listed in good condition and is not in need of any immediate replacement or relocation at this time.

There are no alternatives to these improvements. The proposed project is appropriate, technically feasible, and should produce the desired results. The design of the proposed improvements will be reviewed and approved by the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences prior to the beginning of construction. These are not priority improvements and the WQB doesn't have a firm opinion on the project proposal, and has ranked it in the middle of its list of priority projects.

#### FINANCIAL ASSESSMENT:

The total project costs are estimated to be \$77,590 with \$63,481 for construction and contingencies and the balance for administration, plans, and specification preparation and other associated technical costs. The applicant has requested a \$28,950 grant from DNRC. The town will provide \$1,000 of in-kind administrative services while the Montana Department of Highways (MDOH) will supply the remaining \$47,640 of funding.

The cost estimates were made using MDOH compiled bid tabulations, contractor's estimates, and material suppliers' quotes. The cost estimates appear to be realistic and reasonable and the only alternative available was proposed.

#### ENVIRONMENTAL ASSESSMENT:

The only adverse impacts that will result from this project are those minor, short-term effects typically associated with construction projects. Project construction will take place in existing right-of-ways.

#### RECOMMENDATION:

A grant of 25 percent of the total project costs up to a maximum of \$19,150 is recommended, contingent upon the city obtaining a statement from its engineer concurring that any improvements installed under this project will meet the future demands and needs of the community. The city should also look at conducting a Master Water Plan to evaluate and prioritize any upcoming water system improvements needed. If grant funding is not available for this project, the city may request a loan of up to \$28,950. Any reduction in the scope will result in a proportionately smaller grant and DNRC must also approve the project scope of work and budget.



APPLICANT NAME: Stillwater Conservation District

PROJECT/ACTIVITY NAME: Park City Water Development

AMOUNT REQUESTED: \$45,474 Grant

OTHER FUNDING SOURCES AND AMOUNTS: \$2,000 - Stillwater  
Conservation District  
\$5,844 - Park City Water  
Company

TOTAL PROJECT COST: \$53,318

PROJECT DESCRIPTION:

Park City is an unincorporated community of about 300 people located along Interstate 90 and the Yellowstone River, about 25 miles west of Billings. The purpose of this project is to develop a stable gravity water system that will furnish irrigation water and fire flows to the main portion of the community for approximately 80 tracts of land from 1/4 acre to 2 acres in size. The project will conserve water, furnish a dependable water supply for fire control, and keep water out of an already high water table. The project will only be used during the irrigation season.

The project begins at the headgate of the Big Ditch and runs through the community. Thirteen hundred feet of 10-inch plastic and steel pipe would replace the existing 18-inch wooden pipe, and 6,000 feet of 4-inch plastic pipe would replace the existing 4-inch wooden pipe. The lines would be looped and 11 fire hydrants would be installed.

TECHNICAL ASSESSMENT:

The present Park City system was intended strictly for irrigation and was constructed of wooden lines in 1935. Fire protection is quite limited with this system and water runs continuously while leaking through old wooden lines and joints. This excess water enters the already high water table. The present system wastes water, contributes to an already high water table, and requires a lot of energy to operate.

The proposed project will loop the present system increasing the pressure, provide an adequate irrigation water supply, and save an estimated 264 acre-feet of water annually. The system will add 11 fire hydrants for improved fire protection, save energy by not running continuously, and more efficiently distribute the available water to 80 lots in town.

The project appears to be appropriate and technically feasible and should produce the desired results. The Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences agrees that a final useful product will be

generated, but they mentioned that an engineering report would be valuable in determining if the design is adequate. The WQB agrees with the concept of the project but has ranked it last on its list of priority projects.

FINANCIAL ASSESSMENT:

The total project cost is \$53,318. Of this total, \$44,000 is for construction and the balance is for administration, a project inspector, and inflation contingencies. The applicant has requested a \$45,474 grant from the DNRC. The Stillwater Conservation District will contribute \$2,000 of funds while the Park City Water Company will contribute the remaining \$5,844 to complete the funding.

The cost estimates appear realistic and reasonable, and it appears as though this is the most cost-effective alternative available.

ENVIRONMENTAL ASSESSMENT:

The only adverse impacts that will result from this project are those minor short-term effects typically associated with construction projects. Positive impacts will be the conservation of an estimated 264 acre-feet of water, increased fire protection, decreased energy use, and lowering of the water table which should improve the land quality.

RECOMMENDATION:

A grant of 25 percent of the total project costs up to \$13,330 is recommended contingent upon the community securing the remaining project funds. If grant funding is not available for this project, the community may request a loan for the entire DNRC amount up to a total of \$45,474. Any reduction in the scope will result in a proportionately smaller grant and should not affect priority improvements. DNRC must also approve the project scope of work and budget.

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APPLICANT NAME: Private Applicant

PROJECT/ACTIVITY NAME: Big Sky Dam

AMOUNT REQUESTED: \$18,277

OTHER FUNDING SOURCES AND AMOUNTS: \$54,829 - Boyne U.S.A.

TOTAL PROJECT COST: \$73,106

PROJECT DESCRIPTION:

The Big Sky Dam, located near the Big Sky ski resort 45 miles south of Bozeman, was constructed in 1972-73 as a recreation site and fish and wildlife storage facility. The 52 foot high, rolled

earth dam impounds 225 acre feet when full, has a crest length of 400 feet, a gated RCP conduit outlet, an uncontrolled concrete drop inlet principal spillway and an unlined earth emergency spillway. The structure is privately owned and operated. The dam was determined to be an unsafe high hazard dam by a Corp of Engineers Phase I inspection report. This report established the inability of the outlet works to pass the probable maximum flood (PMF), identified downstream seepage concerns; questioned the stability of the embankment, and noted several appurtenant deficiencies and operational concerns. The project sponsor has hired a consulting firm to address the safety issues identified in the Phase I inspection report. The consultant will investigate the dam rehabilitation needs and prepare the required designs with the objective of complying with Montana dam safety guidelines. Specifically, the consulting firm intends to investigate foundation and embankment conditions; perform geotechnical, hydrologic, and hydraulic analysis; prepare a downstream emergency warning plan; design outlet work improvements; prepare an O&M plan; preliminarily design a modified emergency spillway; and design a seepage control system.

#### TECHNICAL ASSESSMENT:

The high hazard classification established in the Phase I inspection report is based on field inspections and professional judgement. No breach analysis or dam break hydrograph routing was performed to support this classification. However, there are homes and condominiums downstream of the dam, and given the potential for loss of life, it is likely that the state will also classify the structure as a high hazard dam. Such a determination could be made prior to project funding.

Although the general approach to the proposed dam rehabilitation appears to have all the necessary elements, the specific investigations and analyses to be performed, the organization of the study effort and the final products are not adequately described. The project should be more thoroughly developed prior to disbursement of project funds.

#### FINANCIAL ASSESSMENT:

The total project cost is estimated to be \$73,106 of which DNRC is requested to share 25 percent. In general terms, the project costs seem consistent with other similar projects, but the validity of cost estimates for specific tasks is impossible to assess without more detail describing actual work to be performed. Costs should be critiqued after a more detailed scope of work is developed and prior to project funding.

#### ENVIRONMENTAL ASSESSMENT:

This project is basically a study and design effort and will have no adverse environmental impact. Specific impacts that may be associated with construction cannot be defined until a specific dam rehabilitation plan is developed.

RECOMMENDATION:

A grant of 25 percent of total project costs up to \$18,277 is recommended, contingent on DNRC approval of the project scope of work and budget.

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APPLICANT NAME: Green Mountain Conservation District

PROJECT/ACTIVITY NAME: Fire Hydrant Installation

AMOUNT REQUESTED: \$18,720

OTHER FUNDING SOURCES AND AMOUNTS: \$1,920 - Green Mountain C.D.  
\$3,500 - Volunteer Fire Dept.  
(in-kind)

TOTAL PROJECT COST: \$24,120

PROJECT DESCRIPTION:

The town of Trout Creek, located 60 miles south of Libby, is provided with fire protection by a volunteer fire department with 3 pumper trucks and 1 fire hydrant. The town is requesting grant funds to add 14 fire hydrants to its existing water system. The existing water system consists of one 285 foot well which produces 350 gpm, one 25 hp submersible pump, one 70,000 gallon storage tank, 6,140 feet of 6-inch main, and 8,280 feet of 4-inch main.

TECHNICAL ASSESSMENT:

Although it is not hard to believe that 1 fire hydrant does not provide adequate fire protection for the town, the information presented does not establish the need for 14 additional fire hydrants, nor does it establish the capability of the system to support 14 fire hydrants. Many of the towns residential mains appear to be 4-inch mains but, Montana design standards prohibit installation of fire hydrants on mains less than 6 inches in diameter. The project sponsor and designer need to coordinate with the Insurance Services Office to ensure the project attempts to meet insurance guidelines for flows, main size, and hydrant placement. In addition, the Department of Health and Environmental Sciences needs to approve the project plans and specifications prior to construction.

Better project plans and specifications need to be developed prior to project construction.

FINANCIAL ASSESSMENT:

The total project cost is \$24,120 and is distributed as follows: Fire District - \$3,500 (in-kind); Conservation District



- \$1,920 (in-kind) and DNRC \$18,720. Present water rates are \$12 per month and fire district rates are \$12 per month.

ENVIRONMENTAL ASSESSMENT:

Short-term land disturbances could be expected during project construction.

RECOMMENDATION:

A grant of \$18,720 is recommended contingent on DNRC approval of the project scope of work and budget. Better project plans need to be developed prior to project construction.

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APPLICANT NAME: Lakeside Water District

PROJECT/ACTIVITY NAME: Stoner Creek Road and Woodacres Main Extensions

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: \$14,831 - Lakeside Water District

TOTAL PROJECT COST: \$114,831

PROJECT DESCRIPTION:

The Lakeside Water District is located in Flathead County along the west shore of Flathead Lake and services approximately 400 users. The existing water system consists of a 200,000 gallon storage tank; three water wells producing approximately 240 gallons per minute; and a distribution system consisting of 2-inch and 4-inch PVC pipe and 6-inch AC pipe, fire hydrants, and appurtenant structures.

The purpose of this project is to upgrade the pipe size from 2 inches to 6 inches on the main which services Sunrise and Woodacres Subdivisions, and to install a new 6-inch main along Stoner Creek Road. The Woodacres extension will service approximately 13 homes, provide additional fire protection by installing 3 hydrants, and will provide an additional loop from the storage tank. The Stoner Creek Road extension will provide water service to 7 homes, increase fire protection by adding 2 fire hydrants and create another loop in the distribution system.

TECHNICAL ASSESSMENT:

The objective of the Woodacres extension is to reduce the number of water users effected by necessary repairs to the only 6-inch supply line from the storage tank. The addition of this extension adequately loops the distribution system and accomplishes the stated objective. In addition, fire protection and water supply is improved to a few water users. The Stone



Creek extension improves fire protection and water supply. The project is technically feasible and will accomplish project objectives.

FINANCIAL ASSESSMENT:

The project cost is \$114,831, which includes \$9,900 for engineering, \$5,940 for construction inspection, and \$98,991 for construction. Project costs seem reasonable. The present user rates are approximately \$17/month.

ENVIRONMENTAL ASSESSMENT:

Project construction will result in short-term land disturbance.

RECOMMENDATION:

A grant of 25 percent of the total cost up to \$28,500 is recommended and is contingent on DNRC approval of project scope of work and budget.

## CHAPTER II

### THE WATER DEVELOPMENT PROGRAM - LOANS GREATER THAN \$200,000 COAL SEVERANCE TAX BONDS

#### A. Program Description and History

In 1981, the legislature adopted S.B. 409 which provided for the issuance of up to \$250 million in Montana coal severance tax bonds "for financing specific water resource development projects and activities in the state authorized by the legislature."

Statute provides that loans from coal severance tax bond proceeds be administered by the Department of Natural Resources and Conservation, and that projects be reviewed to determine their technical and financial feasibility. The DNRC has been working since 1983 with project sponsors authorized to receive loans from coal severance tax proceeds to assure project feasibility and prepare for local bond purchase transactions. In February 1984, the Montana Supreme Court case, Grossman vs. State of Montana, which tested the constitutionality of the bonding authority, was resolved in the state's favor and preparations began for the first Montana Coal Severance Tax Bond. A \$10,485,000 issue was sold in August 1984. The 20-year bond was sold for 10.26 percent.

In September 1985, a \$16,865,000 bond was sold at an interest rate of 9.29 percent. This issue refunded the September 1984 bond and provided approximately \$6 million additional funds at a savings of \$50,000 to the state. In December 1985, an \$11,500,000 bond was sold at a variable rate of interest. This issue provides an attractive interest rate, which was 5.2 percent average for 1988. This rate will offset interest subsidy costs and reflect a substantial savings to the Coal Severance Tax Trust Fund.

In December 1987, a \$1,215,000 bond was sold at a fixed rate of 7.32 percent for a term of 20 years to finance projects. In November 1987, a \$22,200,000 bond was sold on a variable rate to finance the tax exempt portion of constructing hydropower on the state-owned Toston Dam, and a \$3,150,000 bond was sold to finance the taxable portion of the Toston Dam hydropower project.

#### B. Interest Rates

The interest rate on loans to public entities made from coal severance tax bond proceeds is established by the legislature, and coal severance tax revenues can be used to reduce the interest rate on these loans, which are made from state bond proceeds, below the rate at which the state bond is sold. Therefore coal severance tax bonds are payable from revenues of the water development projects financed by the bond proceeds and from coal severance tax proceeds. To implement these repayment provisions, the statute established a fund structure within the

permanent coal tax trust fund. A coal severance tax bond fund was established to which coal tax revenues are credited when collected and from which transfers are made to the coal severance tax permanent trust fund except for the amount necessary to meet the coal severance tax bond principal and the interest payable on the next two semiannual payment dates. The project revenues and monies in the coal severance tax bond fund secure these bonds.

The 1985 Legislature requested that the DNRC recommend a methodology for giving differential interest rates to the projects recommended for loans. A method has been derived that considers the user rate as a percentage of "the median family income" on municipal projects. The 1987 Legislature further modified this method by considering the user rate as a percentage of the "median household income" on municipal projects.

### C. 1988 Loan Applications

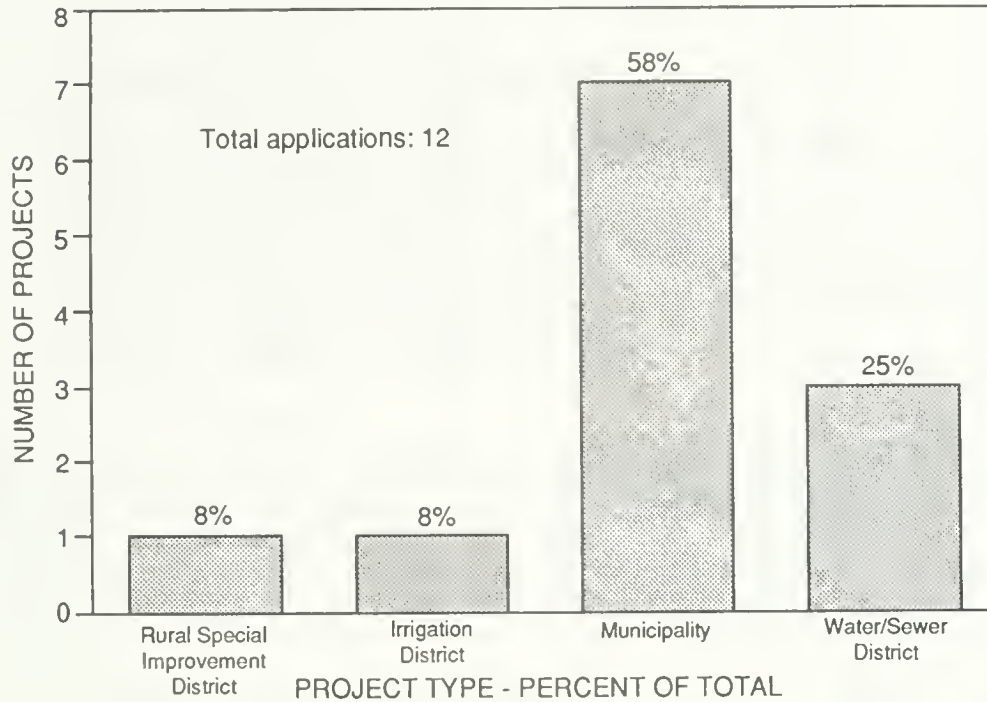
Figures 2.1 and 2.2 give a breakdown by applicant and project type of the 12 Coal Severance Tax Loan applications submitted to the DNRC.

Table 2 lists the Coal Severance Tax Loan applications received in 1988 and the loan recommendations made by the department. If less than 1 percent of "the median household income" is used to pay user rates, then no subsidy was recommended. If the user rate is at least 1 percent but less than 2 percent, then a 1 percent interest rate subsidy for five years was recommended. If the user rate is at least 2 percent, but less than 4 percent, then a 2 percent interest rate subsidy for five years was recommended. If the user rate is greater than 4 percent of the "median household income", then a 3 percent interest rate subsidy for five years was recommended.

As shown on Table 2, one irrigation project is being recommended for a 30-year loan at 3 percent. These are terms which will provide cash flow for the projects and are consistent with terms given to similar projects funded in previous bienniums.

The remainder of the loan applications are for municipal and rural water and wastewater projects. Detailed project summaries follow Table 2.

**FIGURE 2.1**  
**COAL SEVERANCE TAX LOAN PROGRAM**  
**APPLICATIONS BY APPLICATION TYPE - 1988**



**FIGURE 2.2**  
**COAL SEVERANCE TAX LOAN PROGRAM**  
**APPLICATIONS BY PROJECT TYPE - 1988**

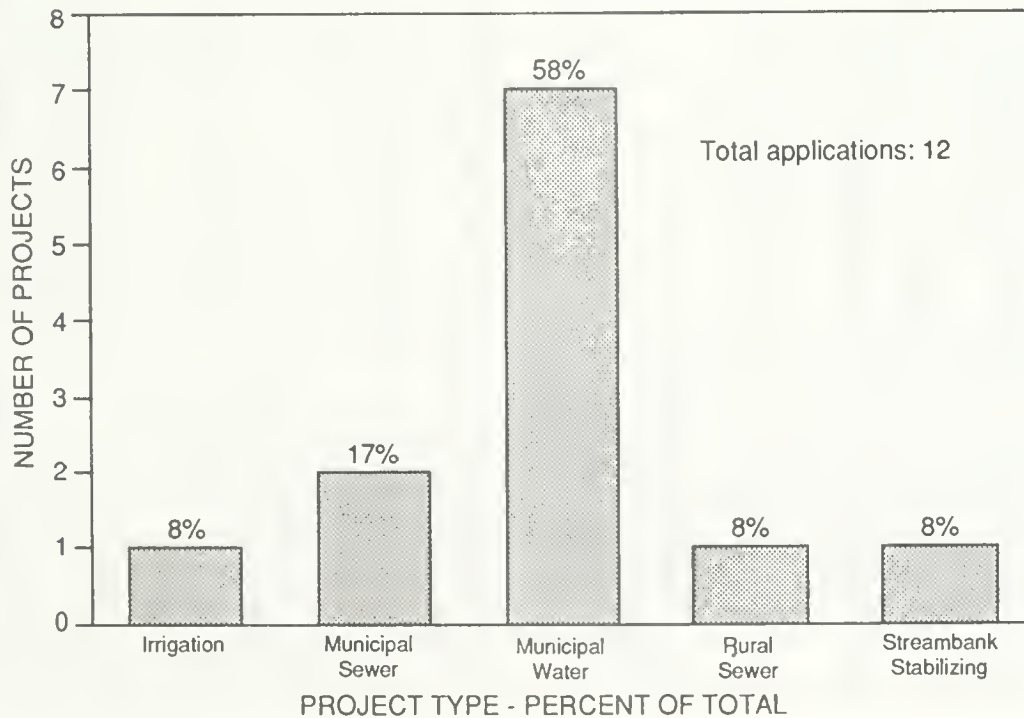




Table 2

WATER DEVELOPMENT PROGRAM  
COAL SEVERANCE TAX LOANS

<u>Applicant Name</u>	<u>Project Name</u>	<u>Loan Recommended</u>	<u>Interest Rate and Term</u>
City of Bozeman	Lyman Creek Water System Improvement	\$ 386,893	2% below bond rate for 5 years and at bond rate for 15 years.
East Bench	Gravity Sprinkler Irrigation #3	\$ 431,000	3% for 30 yrs.
Town of Fairview	Water Treatment Facility Improvements	\$ 258,250	1% below bond rate for 5 years and at bond rate for 15 years.
City of Glendive	Water Treatment Plant	\$4,075,000	2% below bond rate for 5 years and at bond rate for 15 years.
Lake County/Big Arm Sewer District	Big Arm Sewer	\$2,283,893	3% below bond rate for 5 years and at bond rate for 15 years.
City of Miles City	Water Treatment/Pre-sedimentation Basin	\$1,532,910	1% below bond rate for 5 years and at bond rate for 15 years.
Noxon Community Gravity Water Co.	Water System Improvement-Phase I	\$ 593,950	3% below bond rate for 5 years and at bond rate for 15 years.
Park County Water District/Gardiner	Jardine Pressure Zone Improvements	\$ 360,500	1% below bond rate for 5 years and at bond rate for 15 years.
Somers County Water and Sewer District	Somers Sewer	\$3,151,960	3% below bond rate for 5 years and at bond rate for 15 years.
City Of Whitefish	Water Treatment and Distribution	\$6,035,800	2% below bond rate for 5 years and at bond rate for 15 years.
Town of Wibaux	Water Storage Reservoir/ Transmission Line	\$ 250,000	2% below bond rate for 5 years and at bond rate for 15 years.
Anaconda/Deer Lodge County	Wastewater Treatment Plant Efficient Disposal	No Funding	

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APPLICANT NAME: City of Bozeman

PROJECT/ACTIVITY NAME: Lyman Creek Water System Improvements

AMOUNT REQUESTED: \$386,893.33

OTHER FUNDING SOURCES AND AMOUNTS: \$726,079 - 1985 DNRC Loan

TOTAL PROJECT COST: \$1,202,234.67

PROJECT DESCRIPTION:

The City of Bozeman obtains its municipal water supply from surface water flows in three local watersheds. Municipal water demands exceed the city's reliable water supply by more than 20 percent during dry years. In addition to a supply shortage, the city is concerned over potential Giardia lamblia contamination in Lyman Creek, which is one of the three existing water sources. Contamination of this source would increase current water supply problems.

The Lyman Creek system water originates primarily from springs. Water is diverted from the creek some distance below the springs and stored in an open reservoir. The open creek channel and open storage facility pose a continued contamination threat. The city has requested funds to enclose all exposed portions of the system to eliminate the potential problem. An alternative treatment option was determined to be more costly.

TECHNICAL ASSESSMENT:

Water from the Lyman Creek system is considered good in quality and has required only flouride and chlorine treatment. Lyman Creek provides a gravity flow supply to all Bozeman customers north of Interstate 90. The North Side customers use less than five percent of the city's total supply. This indicates the Lyman Creek source is not a major contributor of regular consumer demand. However, the supply is used to supplement the remaining supplies and as an emergency source of water for the entire community.

The Water Quality Bureau has assessed the Giardia lamblia problem as a serious threat to the community water supply. The Bureau recommended total enclosure or treatment of the supply as soon as possible. The city has chosen the enclosure option under a phased construction plan. Phase I involves construction of a cover over the storage reservoir. Phase II will extend the pipe conveyance upstream to the springs. The final phase will construct an enclosed spring box. All three phases must be finished to completely eliminate the contamination threat.

FINANCIAL ASSESSMENT:

The total project costs are estimated to be \$1,202,234.67 of

which \$1,021,350.00 is for construction and contingencies with the remaining \$180,884.67 for administration, engineering, financing, and legal costs. Phase I and II are estimated to cost \$808,915 while Phase III costs are estimated at \$350,000. The city has requested a \$1,112,972.22 loan from DNRC while supplying the remaining \$89,259.45 from its own funds.

The city has previously received authorization from the 1985 legislature for a \$726,079 DNRC loan for the project. Total project costs have escalated from the original estimate of \$807,566 to \$1,202,234.67 due to delays in construction. The city's actual request for funding during this legislative session is \$386,893.33.

Current water rates are estimated to be around \$20.00/user/month and will be raised 16 percent to repay the DNRC loan for the improvements listed above.

#### ENVIRONMENTAL ASSESSMENT:

Project construction impacts should be of short duration and limited to the boundaries of the water supply system. Long-term impacts will include preservation of a good quality water supply for the community and increased public access to 250 acres of city property. No significant adverse impacts are anticipated.

#### RECOMMENDATION:

DNRC recommends a \$386,893.33 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 2 percentage points below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median household income. Any reduction in project scope should not affect priority improvements.

Funding is contingent upon the city expending the initial \$726,079 DNRC loan prior to receiving the \$386,893.33 authorized through this request.

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APPLICANT NAME: East Bench Irrigation District

PROJECT/ACTIVITY NAME: Gravity Sprinkler Irrigation System  
Number 3

AMOUNT REQUESTED: \$65,000 Grant  
\$366,000 Coal Severance Tax Loan

OTHER FUNDING SOURCES AND AMOUNTS: \$3,879,000 - Bureau of  
Reclamation (PL984 Loan)

TOTAL PROJECT COST: \$4,310,000

#### PROJECT DESCRIPTION:

A group of ranchers within the East Bench Irrigation District are interested in developing a gravity sprinkler irrigation system. The proposed system is located northeast of Dillon in Beaverhead County and would service 44 farm units and irrigate approximately 7,000 acres. Presently, this area is primarily pump sprinkler irrigated with a minor amount of flood irrigation. The crops produced are limited to small grains and alfalfa.

The proposed project would install three intake/screening structures on the East Bench Canal, bury 17.5 miles of pipe ranging in diameter from 6 inches to 54 inches, and install associated valves, meters, and drains. The applicant anticipates hiring a consultant to perform final design and project administration. The majority of the construction will be contracted but the district will perform some small lateral construction.

#### TECHNICAL ASSESSMENT:

The gravity sprinkler irrigation concept has been successfully applied at a variety of locations in Montana, including locations very near the project area. The preliminary analysis indicates that the topography will provide adequate working pressures with a small percent of working pressures less than 30 psi. Ranchers on these units will employ low pressure sprinklers or booster pumps or a combination of this equipment. Sufficient water is available from the East Bench Canal. System design flows, pipe sizing, appurtenances required, and system layout are based on preliminary analysis using SCS standards. This analysis establishes a reasonable probability of technical feasibility and is adequate to establish conservative cost estimates. Significant design and analysis is required prior to construction.

This project will conserve water by eliminating seepage losses associated with lateral ditches. The project is expected to reduce diversion requirements by 24 cfs.

#### FINANCIAL ASSESSMENT:

The total project cost is estimated to be \$4,310,000 with the following distribution anticipated: construction \$3,500,000; engineering \$275,000; future price projections \$350,000; contingencies \$105,000; Bureau of Reclamation participation \$50,000; and legal \$30,000. Project costs are consistent with other gravity sprinkler projects recently installed near the project area. Annual project costs are anticipated to be \$16.20 per acre based on a 3 percent state loan (\$431,000) and a 0 percent Bureau of Reclamation Small Projects Loan (\$3,879,000). Avoided energy costs are estimated to be \$17 per acre and are the only source of revenue for debt service.

#### ENVIRONMENTAL ASSESSMENT:

The East Bench Canal diverts water from the Beaverhead River, a blue ribbon fishery, and this project may reduce diversion requirements. Abandonment of some project laterals may result in



the loss of some upland game bird habitat.

RECOMMENDATION:

The Department of Natural Resources and Conservation recommends a Coal Severance Tax Loan of \$431,000 at 3 percent for 30 years.

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APPLICANT NAME: Town of Fairview

PROJECT/ACTIVITY NAME: Water Treatment Facility Improvements

AMOUNT REQUESTED: \$258,250 Loan

OTHER FUNDING SOURCES AND AMOUNTS: \$25,000 - Town of Fairview

TOTAL PROJECT COST: \$283,250

PROJECT DESCRIPTION:

The Town of Fairview is located in northeastern Montana along U.S. Highway 200. The town is located in the Yellowstone River valley and has a population of approximately 1,300 people. The municipal distribution system derives its raw water from two wells located in the northern portion of town. The wells have a combined capacity of 400 gallons per minute, which is adequate, but the water is very high in iron and magnesium.

The specific goal of this project is to treat the raw water to reduce the amounts of iron and manganese to levels below the recommended maximum levels. The most cost-effective alternative is to use existing water wells and install a pressurized, magnesium greensand filter treatment facility. The proposed facility will utilize potassium permanganate as the oxidizing agent and the greensand filters to remove the iron and manganese precipitate. The water will be moved through the plant utilizing the existing well pumps. A backwash reclaim basin will be constructed to 1) prevent overloading of the sewer collection system, and 2) to allow the backwash to be reclaimed and a portion reused. The second point is important because reclamation conserves water that normally would be sent to the wastewater treatment facility.

The town has attempted to meter the water system in the past, but the high iron and manganese content of the water has rendered the meters useless. The town currently charges a flat rate for residential users. The lack of metering does not allow for the conservation of water by the users since the users do not pay for the actual quantity of water used. The town would like to gain better control of their water system budget by collecting an equitable amount from the users based on the actual water use.

TECHNICAL ASSESSMENT:

In May of 1988 the town had a preliminary engineering report

performed which evaluated various water sources and treatment alternatives. The most cost-effective alternative has been selected. The water will be moved through the plant utilizing the existing well pumps. The project is technically feasible and will solve Fairview's high iron and manganese problem.

The Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences will review and approve the final design of the project prior to construction. The WQB agrees with the concept and has ranked Fairview's project in the middle of its priority list.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated at \$283,250 of which \$231,000 is for construction costs and contingency and the remaining \$52,250 is for administration, engineering, legal fees, and financing. The applicant has requested a \$258,250 loan from DNRC. The town will provide \$25,000 of funds from the Water Department budget.

The WQB has suggested that the cost of the building and furnishing the necessary equipment may be a little high. However, it appears that the most cost-effective alternative for solving the high iron and manganese in the drinking water has been selected. The town proposes to raise water rates by 64 percent to provide funds for building the water treatment plant. Current flat rates for water use are \$9.90 per user per month and are proposed to increase to \$16.27 per user per month.

#### ENVIRONMENTAL ASSESSMENT:

The proposed project will have a negative impact in the form of dust, emissions, and noise during the construction phase of the project, but these temporary negative effects will be more than offset by the more permanent positive effects. The positive effects will be a higher quality water for domestic and commercial use, reduced staining of home fixtures, and the ability to meter water users to promote water conservation. In addition, buildup of iron sludge in watermain will be reduced, requiring less flushing. This will conserve water and reduce pumping costs.

#### RECOMMENDATION:

DNRC recommends a \$258,250 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 1 percentage point below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median household income. Any reduction in project scope should not affect priority improvements.

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APPLICANT NAME: City of Glendive

PROJECT/ACTIVITY NAME: Glendive Water Treatment Plant

AMOUNT REQUESTED: \$4,075,000

OTHER FUNDING SOURCES AND AMOUNTS: None

TOTAL PROJECT COST: \$4,075,000

PROJECT DESCRIPTION:

The City of Glendive is located in eastern Montana along Interstate 94 and the Yellowstone River about 35 miles from the North Dakota border. The 5,978 residents of Glendive receive water from the existing water treatment plant which performs pretreatment, softening, stabilization, filtration, and disinfection of raw water pumped from intakes on the Yellowstone River. Components of the existing facility are: (1) river intake and low service pumps, (2) presedimentation basins, (3) intermediate pumps, (4) solids contact unit, (5) recarbonation basin, (6) filtration, (7) clear well, (8) high service pumps, (9) backwash pump, and (10) chemical feed equipment. The Montana Department of Health and Environmental Sciences (DHES) has issued a mandate for the City of Glendive to discontinue discharge of sludge from its water treatment plant into the Yellowstone River. The existing water treatment plant is comprised of four basic units constructed at different times between 1929 and 1959 and needs upgrading.

The proposed project will rehabilitate portions of the existing water treatment plant and integrate new construction to bring the water treatment facility up to federal and state requirements as well as meeting future demands. The existing basins, intermediate pumps, the existing solids contact unit, filters, and chemical feed equipment will be rehabilitated while the recarbonation basin, backwash pumps, and the electrical controls will be expanded. New construction includes the intake structure and pumps, the second solids contact unit, clearwell, high service pumps, solids handling facility, and yard piping. The old filter building will be demolished to complete the project.

TECHNICAL ASSESSMENT:

The City of Glendive has completed a master plan for improvements of its municipal water and wastewater systems. The Phase I Design Report for the water treatment plant was completed in October of 1987 and evaluated three alternatives for upgrading the existing Glendive water treatment plant. The plant deficiencies were evaluated, alternatives for upgrading proposed, and cost estimates developed. The preferred alternative proposed completing a combination of rehabilitation and new construction.



The report was comprehensive and adequately addresses all areas of the water system. The need for improvements to the city's water treatment system is well documented and the proposed project is appropriate, technically feasible, and will produce the desired results.

Phase II of the Design Report has begun and includes a pilot study, development of design criteria for the selected treatment process, preparation of detailed general arrangement drawings of the selected process, redefinition of the sequence of water plant improvements required, and preparation of detailed construction costs.

The design of the proposed improvements will be reviewed and approved by the Water Quality Bureau (WQB) of the DHES prior to beginning construction. Conceptually, the WQB agrees with the project proposal and has ranked it high on its list of priority projects.

The WQB is conducting a "Comprehensive Performance Evaluation" of the Glendive Water Treatment Plant on September 19-21, 1988 to assess and analyze the plant performance and make recommendations for upgrades. Additional information may be available when this report is completed which may result in a modification of the Glendive loan application.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$4,075,000 of which \$3,399,000 is for construction and contingencies and the balance for engineering, administration, legal fees, and financing. The applicant has requested a \$4,075,000 loan from DNRC. The applicant intends to pursue funding from the Department of Commerce Community Development Block Grant Program and the Economic Development Administration. Consequently, the amount needed from DNRC may eventually be reduced.

The cost estimates for the intake structures and pumps, new solids contact unit, and chemical feed equipment seem high to DHES reviewers. The most cost-effective alternative available was selected. The town proposes to raise the monthly water user rates from \$13.08 to \$32.08 to repay the DNRC loan. This is based on a 10 percent interest rate and a 20 year term. If a 3 percent interest rate subsidy is approved, the monthly water user rate would be \$27.58 for the first 5 years of the loan.

#### ENVIRONMENTAL ASSESSMENT:

The only adverse impacts that will result from this project are those minor short-term effects typically associated with construction projects. Positive impacts will be an improved disposal of sludge generated in the treatment process that was previously discharged to the Yellowstone River. This will satisfy the DHES mandate.

#### RECOMMENDATION:

DNRC recommends a \$4,075,000 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 2 percentage points below the rate at which the state bond is sold for the first 5 years, and at the



coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median household income. Any reduction in project scope should not affect priority improvements.

Funding shall be contingent upon: (1) if repayment of the DNRC loan requires the city to raise water rates above \$25.00/user/month, then a town election to authorize any bonded indebtedness involving this loan must be held to assure citizen support; and (2) the town must investigate the private bond market to finance the project improvements.

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APPLICANT NAME: Lake County/Big Arm Sewer District

PROJECT/ACTIVITY NAME: Big Arm Sewer

AMOUNT REQUESTED: \$2,283,893

OTHER FUNDING SOURCES AND AMOUNTS: \$2,234,991 - EPA

TOTAL PROJECT COST: \$4,518,884

PROJECT DESCRIPTION:

The unincorporated town of Big Arm is located in Lake County along the south shore of Big Arm Bay of Flathead Lake. The present population of the Big Arm planning area fluctuates from 156 people in the winter to 793 in the summer months. There are also two state parks and a summer resort which have a combined space for 184 recreational vehicles. There is no central public water or sewer in this planning area.

Water is supplied by individual privately owned wells or withdraws from Flathead Lake. Presently, wastewater treatment in the Big Arm area is provided for by individually owned, on-site septic tank drainfields, cesspools, or seepage pits. It is believed that more than 75 percent of the septic tank systems are contributing untreated wastewater to Flathead Lake and should be replaced with a public facility. High groundwater, shallow bedrock conditions, steep slopes, and restrictive soil layers are prevalent in the area. Contamination of existing water supplies is also occurring.

The proposed project will construct a conventional sewage collection system for one part of the planning area that will gather each resident's wastes through a series of 8-inch diameter gravity flow collection mains with manholes every 400 feet. The sewage flows by gravity to a common collection point and is pumped by a lift station to the treatment site. A method for storing and pumping the wastewater during power outages must be provided. A pressure sewer system will collect the sewage from the residents in the remaining parts of the planning area using

grinder pumps and small diameter pressure mains. Lift stations and force mains will be required to connect the collection system to the proposed treatment area.

Treatment of the collected wastewater will consist of constructing a two cell aerated lagoon located southwest of the Big Arm townsite. All of the wastewater will have to be pumped from the main lift station in Big Arm to the treatment site. The treatment facility would include a bar screen, a metering facility, two aerated lagoon cells, an 8 month retention storage pond for winter storage, and a land application area of 52 acres for sprinkler application (center pivot irrigation system) of the treated waste to the soil.

#### TECHNICAL ASSESSMENT:

The Lake County/Big Arm Sewer District has hired an engineer to complete a facility plan which will evaluate the methods of collection and treatment of sanitary sewage for the study area and provide recommendations for improvements that conform with state and federal laws and regulations. The draft facility plan, which is 90 percent complete, has been submitted to the Department of Health and Environmental Sciences (DHES), and a public hearing was held September 29, 1988 to discuss the alternatives proposed. The final facility plan to be completed in October 1988 will incorporate the comments from the public hearing and propose the selected alternative. The alternative proposed in the DNRC loan application was determined by the engineer to be the most cost-effective and appropriate and will most likely be the alternative selected in the final facility plan. However, there is the potential that the selected alternative presented in the final facility plan could be different than the one proposed in the DNRC loan application.

The draft facility plan is comprehensive and adequately addresses the complete planning area of the Big Arm Sewer District. All of the interim and final reports of Flathead Lake water quality spotlight sewage from on-site systems as a major problem. The need for an adequate sewage collection and treatment system for the Big Arm area is evident and well documented. The proposed sewage collection and treatment system for Big Arm is appropriate, technically feasible, and will produce the desired results.

The design of the proposed improvements will be reviewed and approved by the Water Quality Bureau (WQB) of the DHES prior to beginning construction. Conceptually, the WQB agrees with the project proposal, and has ranked it high on their priority list.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$4,518,884 of which \$3,570,528 is for construction and contingencies and the balance is for engineering, financial, legal fees, and administrative costs. The applicant has requested a \$2,283,893 loan from DNRC and will get the remaining \$2,234,991 in an EPA grant to complete the funding.

The cost estimates appear to be realistic and reasonable, and it appears that the most cost-effective alternative available

will be selected. More thorough and complete cost estimates will be available during the design phase of the project. The district proposes to institute a monthly sewer users rate yet to be established to repay the DNRC loan debt.

ENVIRONMENTAL ASSESSMENT:

Adverse impacts resulting from this project will be those minor, short term effects typically associated with construction projects. Positive impacts will be the elimination of untreated effluent from failed septic systems entering Flathead Lake and an improved water quality will result.

RECOMMENDATION:

DNRC recommends a \$2,283,893 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 3 percentage points below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median household income. Any reduction in project scope should not affect priority improvements.

Funding shall be contingent upon the district holding an election to authorize any bonded indebtedness involving this loan to assure citizen support if the sewer rates from the project will be greater than \$25.00/user/month.

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APPLICANT NAME: City of Miles City

PROJECT/ACTIVITY NAME: Miles City Water Treatment Plant  
Pre-sedimentation Basin

AMOUNT REQUESTED: \$1,532,910

OTHER FUNDING SOURCES AND AMOUNTS: None

TOTAL PROJECT COST: \$1,532,910

PROJECT DESCRIPTION:

Miles City is located at the confluence of the Yellowstone and Tongue Rivers in southeastern Montana and has a 1987 population of 10,082 residents. The existing water treatment plant was built in 1974. Its primary function is to remove turbidity from a surface water source. The treatment plant draws raw water from the Yellowstone River, pumps it to the pre-sedimentation basin to remove silt, sand, and other materials before the raw water enters the main treatment process. The existing basin is of earthen construction lined with sand and a synthetic liner and is used year round when it is being cleaned. The purpose of this project is to replace the existing



pre-sedimentation basin at the city water treatment plant. This is required due to the poor condition of the existing basin, the costs of and difficulty with operation and maintenance of the basin, the inability to bypass this basin except with minimum flows, short-circuiting, and expected problems with the plant complying with the forthcoming amendments to the Safe Drinking Water Act.

The new basin will be constructed on the same site as the existing basin and will have vertical concrete walls and a sloping bottom. Sumps will be constructed in the inlet end of the basin to facilitate cleaning. The new basin will have a total volume of approximately 3.5 million gallons and will be divided into two halves so that it can be run either in series or parallel. Multiple inlets and outlets will be used to reduce the present short-circuiting problem, improve efficiency, and allow the facility to meet more stringent drinking water regulations.

#### TECHNICAL ASSESSMENT:

The city has had a Preliminary Engineering Report completed in December of 1987 that examined the existing pre-sedimentation basin at the water treatment plant and evaluated alternatives for upgrading this basin. The alternatives were evaluated based on costs, ease and flexibility of operation, and with consideration of the proposed state and federal drinking water regulations.

Two new concrete pre-sedimentation basins are recommended for pre-treatment and will be designed for manual cleaning with the flexibility of the addition of mechanical sludge removal and/or chemical clarification in the future. Prior to final design, a three-week pilot study will be performed on the recommended treatment components to (a) compare the effectiveness of the treatment process, (b) discover unforeseen treatment problems, and (c) assure the effectiveness of the proposed treatment.

The Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences has reviewed this report and agrees with the recommended improvements. The improvements are needed, are consistent with the Water Quality Bureau requirements, are technically feasible, and will solve the existing problem. The design of the proposed improvements will be reviewed and approved by the WQB prior to construction. The project as proposed has ranked second on the WQB list of priority projects.

#### FINANCIAL ASSESSMENT:

The total costs of the project are estimated to be \$1,532,910 with \$1,286,881 for construction and contingencies and the balance for administration, engineering, and financing. The applicant has requested a \$1,532,910 loan from DNRC.

The cost estimates appear realistic and reasonable, and it appears as though this is the most cost-effective alternative available. The city proposes to have a 12 percent water rate increase to service the indebtedness incurred by this project. The average residential water bill will raise from \$13.13 per user per month to \$14.71 per user per month.



ENVIRONMENTAL ASSESSMENT:

This project should have no negative effects on water quantity and quality, soils, vegetation, wildlife, or other natural resources. All of the project's construction is in the same location as the existing facilities at the water plant site. No new areas will be disturbed resulting in any impact on the factors listed above. The quantity of water used by the city will not change from what it would have been otherwise with this construction. The quality of the finished water that is used by the city residents will be improved. The entire project site is city owned and no land, easements, or permits are needed to construct this project.

RECOMMENDATION:

DNRC recommends a \$1,532,910 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be one percentage point below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median household income. Any reduction in project scope should not affect priority improvements.

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APPLICANT NAME: Noxon Community Gravity Water Company

PROJECT/ACTIVITY NAME: Noxon Water System Phase I Improvements

AMOUNT REQUESTED: \$593,950 Loan

OTHER FUNDING SOURCES AND AMOUNTS: None

TOTAL PROJECT COST: \$593,950

PROJECT DESCRIPTION:

Noxon is a small, unincorporated community of 320 people in the northwest corner of Sanders County and is located along the Clark Fork River and Highway 200 about 15 miles from the Idaho border. The Community Gravity Water Company is responsible for operating the town's water system which consists of two deep water wells which each supply 200 gallons per minute of acceptable quality water; a deteriorating 25,000 gallon redwood storage tank that is barely usable; and a distribution system that includes several portions of leaking wooden lines, several undersized mains (0.75 inch to 1.5 inch diameter), a limited amount of fire hydrants, and inadequate valving. The original water system was constructed in the early 1930s. In addition, the east portion of the community is without fire hydrants, the distribution system is not looped or buried six feet deep, there

are no water meters, and fire protection is quite limited.

This project will include constructing a new 150,000 gallon, ground level, steel water storage tank; replacing the existing 8-inch diameter wooden transmission main to the storage tank with an 8-inch diameter PVC main; replacing the existing 6-inch wooden water main to the commercial district with a 6-inch PVC main; replacing all mains smaller than 4 inches in size with 6-inch PVC water mains; installing 10 new fire hydrants; and installing new water services and meters to each resident. These improvements will upgrade the water system to provide reliable domestic and fire flows for the design population.

#### TECHNICAL ASSESSMENT:

In May of 1988, the Noxon Community Gravity Water Company hired a consulting engineering firm to prepare a water system analysis and preliminary engineering report to evaluate the current condition of the existing water system and develop recommendations for future improvements. The report analyzes the present and future needs for water supply, treatment, pumping, transmission, fire protection, storage, and distribution. The report was very comprehensive and identified deficiencies in each area of the water system-supply, storage, and distribution.

The report prioritized the water system needs into three phases and two levels, immediate and future need. The project proposed will implement all of Phase I and a portion of Phase II of the immediate need level. The need for improvements is well documented and the proposed project is appropriate, technically feasible, and will produce the desired results.

The design of the proposed improvements will be reviewed and approved by the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences prior to beginning construction. Conceptually, the WQB agrees with the project proposal, and has ranked it high on its list of priority projects.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$593,950 of which \$473,210 is for construction and contingencies and the balance is for administration, engineering, and financing. The applicant has requested a \$593,950 loan from DNRC for the total project costs.

The cost estimates appear realistic and reasonable and it appears as though the most cost-effective alternatives were selected. The Community Gravity Water Company proposes to raise water users fees from \$10.00/user/month to \$66.95/user/month to retire the debt from the DNRC loan.

#### ENVIRONMENTAL ASSESSMENT:

The only adverse impacts that will result from this project are those minor, short-term effects typically associated with construction projects such as increased noise and dust levels. Positive impacts will be improved water quality by eliminating deteriorating wooden mains, reliable domestic and fire flow for the present and future, reduced leakage in the distribution

system, and reduced power consumption.

RECOMMENDATION:

DNRC recommends a \$593,950 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 3 percentage points below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in a recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median household income. Any reduction in project scope should not affect priority improvements.

Funding shall be contingent upon: (1) the community's complete analysis of all available grant funding programs the project may be eligible for including Community Development Block Grant, Farmers Home Administration, and Economic Development Administration; (2) the formation of a rural special improvement district or a county water and sewer district; and (3) a town election to authorize any bonded indebtedness involving this loan to assure citizen support, since the water user rates will be increased to above \$25.00/user/month.

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APPLICANT NAME: Gardiner-Park County Water District

PROJECT/ACTIVITY NAME: Jardine Pressure Zone Improvements

AMOUNT REQUESTED: \$360,500

OTHER FUNDING SOURCES AND AMOUNTS: \$9,300 - Gardiner-Park  
County Water District

TOTAL PROJECT COST: \$369,800

PROJECT DESCRIPTION:

The Gardiner-Park County Water District is located at the northwest entrance to Yellowstone National Park and serves the Town of Gardiner along with a small area in the park. The district presently services approximately 250 residential users and 75 business customers. The Gardiner water system is divided into two pressure zones, the main and the Jardine pressure zones. The present water system has three water sources: a spring, a well, and a package filtration plant that uses Yellowstone River water. Storage for this system consists of a steel 300,000 gallon reservoir and a concrete 150,000 gallon reservoir in the main pressure zone, while a 36,000 gallon steel tank services the Jardine pressure zone. The water distribution system consists of



2-inch, 4-inch, 6-inch, and 8-inch lines serving the two pressure zones.

The problems identified in the Jardine pressure zone are lack of pressure, lack of storage, and inadequate feed line sizing to the booster pumps. The project proposed by the district will improve the pressure by increasing the distribution system capacity with larger sized lines, looping the dead end lines, constructing a new 200,000 gallon steel tank at a higher elevation in the zone, and replacing the old spring box. The Jardine pressure zone presently has a building moratorium until water system improvements are completed.

#### TECHNICAL ASSESSMENT:

A Water System Facility Study, completed during the spring of 1987, evaluated the Gardiner-Park County Water District municipal water system, determined the areas of deficiencies, and recommended three phases of improvements to solve the water system deficiencies. The Jardine pressure zone was identified as the number one priority for improvements and the associated costs were estimated. The need for these improvements are well documented and evident with the building moratorium issued in this area. The proposed project is appropriate, technically feasible, and will produce the desired effects.

The design of the proposed improvements will be reviewed and approved by the Water Quality Bureau (WQB) of the Department of Health and Environment Sciences prior to beginning construction. Conceptually, the WQB agrees with the project proposal, and has ranked the project in the middle of its project priority list.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$369,800 of which \$296,285 is for construction and contingencies, and the balance is for engineering, administration, legal fees, and financing. The applicant has requested a \$360,500 loan from DNRC while supplying \$9,300 of their own funds. The cost estimates appear to be realistic and reasonable, and the most cost-effective alternative available appears to have been selected.

The present water user rates in the district average about \$12.20/user/month. The district proposes to raise the water rates by about 10 percent to provide funds for the retirement of the DNRC loan. This will raise the future water rates to about \$13.40/user/month.

#### ENVIRONMENTAL ASSESSMENT:

The only adverse impacts that will result from this project are those minor short-term effects typically associated with construction projects. Most of the construction will take place in previously disturbed areas. The water mains are in existing streets except for the proposed looped lines. Positive impacts will be associated with a more consistent water supply and a decreased fire hazard level.

#### RECOMMENDATION:

DNRC recommends a \$360,500 loan from the sale of coal



severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 1 percentage point below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. The rate will be based on the annual water rates in relation to the median household income. Any reduction in the project scope should not affect priority improvements.

-----

APPLICANT NAME: Somers County Water and Sewer District

PROJECT/ACTIVITY NAME: Somers Sewer

AMOUNT REQUESTED: \$3,151,960 Loan

OTHER FUNDING SOURCES AND AMOUNTS: \$3,389,600 - EPA

TOTAL PROJECT COST: \$6,541,560

PROJECT DESCRIPTION:

The unincorporated town of Somers is located in northwestern Montana along the north shore of Flathead Lake in Flathead County. The 333 homes in the planning area are without a public sewer system at present and dispose of wastewater through septic tanks and soil absorption systems. One out of every five of these privately owned, on-site disposal systems has failed since 1972.

The area within the proposed boundaries of the district poses many problems for installation of on-site, subsurface sewage treatment systems. The Somers townsite is built upon a hill with extensive areas of very shallow bedrock, and many areas are too steep to permit installation of on-site systems. In addition, some areas of the district have very shallow groundwater, are too close to surface water to meet the required setbacks, or have lots too small to accommodate this type of system.

The proposed project will construct a conventional sewage collection system taking each resident's waste through a series of 8-inch diameter gravity flow collection mains with manholes every 400 feet. The sewage flows by gravity to a common collection location and lift stations pump the sewage to the treatment site.

Treatment of the collected wastewater will consist of utilizing the existing Lakeside wastewater treatment plant with spray irrigation. This facility was completed in 1988 and consists of a two cell aerated lagoon followed by a storage cell for holding the treated wastes through the winter months. To accommodate Somers's wastewater flows, an additional winter storage basin and center pivot irrigation system will have to be constructed. In order to utilize this present facility for

disposal of treated wastes, the Somers County Water and Sewer District will have to reach an agreement with the Lakeside County Sewer District.

#### TECHNICAL ASSESSMENT:

The Somers County Water and Sewer District has hired an engineer to complete a facility plan which will evaluate the methods of collection and treatment of sanitary sewage for the study area and provide recommendations for improvements that conform with state and federal laws and regulations. The draft facility plan, which is 90 percent complete, has been submitted to the Department of Health and Environmental Sciences (DHES) and a public hearing will be held September 22, 1988 to discuss the alternatives proposed. The final facility plan to be completed by early November 1988 will incorporate the comments from the public hearing and propose the selected alternative.

The alternative proposed in the DNRC loan application was determined by the engineer to be the most cost effective and appropriate and will most likely be the alternative selected in the final facility plan. There is the potential that the selected alternative presented in the final facility plan could be different than the one presented in the DNRC loan application.

The draft facility plan is comprehensive and adequately addresses the complete planning area of the Somers County Water and Sewer District. All of the interim and final reports of Flathead Lake water quality spotlight sewage from on-site systems as a major problem. The need for an adequate sewage collection and treatment system for the Somers area is evident and well documented. The proposed sewage collection and treatment system for Somers is appropriate, technically feasible, and will produce the desired results.

The design of the proposed improvements will be reviewed and approved by the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences prior to beginning construction. Conceptually, the WQB agrees with the project proposal, and has ranked it high on its priority list.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$6,541,560 of which \$5,427,010 is for construction and contingencies, and the balance is for engineering and financial costs. The applicant has requested a \$3,151,960 loan from DNRC and will get the remaining \$3,389,600 in an EPA grant to complete the funding.

The cost estimates appear to be realistic and reasonable, and it appears that the most cost-effective alternative available will be selected. More thorough and complete cost estimates will be available during the design phase of the project. The district proposed to institute a monthly sewer rate yet to be established to repay the DNRC loan debt.

#### ENVIRONMENTAL ASSESSMENT:

Adverse impacts resulting from this project will be those minor, short term effects typically associated with construction projects. Positive impacts will be the elimination of untreated

effluent from failed septic systems entering Flathead Lake resulting in an improved water quality.

RECOMMENDATION:

DNRC recommends a \$3,151,960 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 3 percentage points below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median household income. Any reduction in project scope should not affect priority improvements.

Funding shall be contingent upon the district holding an election to authorize any bonded indebtedness involving this loan to assure citizen support, if the sewer rates from the project will be greater than \$25.00/user/month.

-----

APPLICANT NAME: City of Whitefish

PROJECT/ACTIVITY NAME: Whitefish Water Treatment and  
Distribution Project

AMOUNT REQUESTED: \$6,035,800 Loan

OTHER FUNDING SOURCES AND AMOUNTS: \$1,920,500 - City of  
Whitefish

TOTAL PROJECT COST: \$7,956,300

PROJECT DESCRIPTION:

The City of Whitefish, with a population of about 4,500 people, is located in northwestern Montana, 15 miles north of Kalispell and just to the west of Glacier National Park. The existing water supply for the Whitefish water system consists of two surface water sources, Haskill Creek and Whitefish Lake.

Haskill Creek is the primary source of water and consists of three stream diversions and a raw water supply pipeline which terminates at an open and unlined 9 million gallon capacity reservoir. Water leaves the reservoir via a submerged, screened intake and flows under pressure to a chlorination facility. The water is chlorinated, delivered to the city through an 18-inch cast iron pipe, and distributed to the users through approximately 300,000 lineal feet of mains ranging in size from 4-inch to 18-inch.

Whitefish Lake is the secondary water source that is used to augment Haskill Creek water during maximum demand days or emergency situations. Two pump stations with a combined capacity of 1,800 gallons per minute pump water from the lake directly



into the water distribution system. Chlorine is added to the water at the pump stations for disinfection but there are no chlorine contact time provisions. A 750,000 gallon steel tank stores this treated water.

The quality of the lake water can not meet federal and state safe drinking water requirements and also has some minor odor and taste problems. The Haskill Basin water is of good quality but has turbidity problems with spring runoff, and the raw water impounded in the 9 million gallon open reservoir is susceptible to contamination and excessive algae growth. Both sources also have the threat of giardia contamination. Some fire flow deficiencies also exist in certain areas of town.

The purpose of this project is to construct a water treatment facility and upgrade the distribution system to supply the City of Whitefish a good quality water supply in sufficient quantity to meet the needs of the community over the next 20 years. The project consists of construction of an additional supply line across the railroad tracks and the river linking the north and south parts of the city; construction of a second supply line from the existing 9 million gallon reservoir to the city; construction of a new intake and pump station on Whitefish Lake; construction of a new transmission pipeline between the new pump station and the existing 9 million gallon reservoir; construction of a new 4 million gallon water treatment facility and the construction of a new 1 million gallon storage reservoir.

#### TECHNICAL ASSESSMENT:

The City of Whitefish has hired a consulting engineer who has completed the following reports on the Whitefish water system: (1) Investigation of Giardia Disinfection Processes, (2) Water Distribution System Analysis, and (3) Whitefish Water Master Plan. The Water Master Plan, completed in 1987, discussed the existing water system and its deficiencies; future service area, population, and water needs; a place for upgrading the water system to meet federal and state safe drinking water requirements; and costs for upgrading alternatives along with funding options.

A water treatment plant facility is needed because both water supply sources are subject to giardia, bacteria and viruses, minor tastes and odors. Proposed new federal and state standards will require some form of treatment other than disinfection for both supply sources. The northern portion of the city has experienced giardia problems since the spring of 1985 requiring a boil advisory to be issued.

The Water Master Plan thoroughly discussed the city's problems and the selected alternative appears to be technically feasible, appropriate, and should achieve the desired results. The design of the proposed improvements will be reviewed and approved by the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences prior to beginning construction. Conceptually, the WQB agrees with the project proposal, and has ranked it very high on a list of its priority projects.



#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$7,956,300 of which \$7,210,500 is for construction and contingencies, and the balance is for engineering, administration, and financing. The applicant has requested a \$6,035,800 loan from DNRC and will supply the remaining \$1,920,500 of project funds from raised water rates and reserve accounts already established.

The cost estimates appear realistic and reasonable for what is proposed and it appears as though the most cost-effective alternative available was selected. Current residential water rates are \$8.00 per user per month and will increase to \$31.00 per user per month to retire the indebtedness from the loan.

#### ENVIRONMENTAL ASSESSMENT:

The only adverse impacts that will result from this project are those minor short-term effects typically associated with construction projects. Positive impacts that will result are an improved water quality that will meet the future federal and state Safe Drinking Water Act and prevent the threat of contamination from giardia. The boil advisory in the northern part of the city will also be dropped.

#### RECOMMENDATION:

DNRC recommends a \$6,035,800 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 2 percentage points below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median household income. Any reduction in project scope should not affect priority improvements.

Funding shall be contingent upon: (1) a city election to authorize any bonded indebtedness involving this loan to assure citizen support, if the water user rates will increase to above \$25.00/month/user; and (2) an investigation of the potential for bonding the requested amount through a private bonding company.

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APPLICANT NAME: Town of Wibaux

PROJECT/ACTIVITY NAME: Water Storage Reservoir and Transmission Line

AMOUNT REQUESTED: \$50,000 Grant  
\$200,000 Loan

OTHER FUNDING SOURCES AND AMOUNTS: None

TOTAL PROJECT COST: \$250,000

PROJECT DESCRIPTION:

The Town of Wibaux is located on the eastern edge of Montana approximately eight miles from the North Dakota border along Interstate 94. The town's water works system consists of a 100,000-gallon elevated storage tank and a water distribution system with 4-inch, 6-inch, and 8-inch cast iron mains. Water is supplied by two wells pumping a total of 330 gallons per minute (gpm). The supply is adequate, although a high sodium content occasionally occurs. Parts of the water works system, including the elevated storage tank, are over 60 years old. Tank inspections have found many holes and leaks in need of repair.

The project improvements that would be funded include the construction of a new, on-ground 100,000 gallon water storage reservoir and a new 8-inch transmission line from the existing water wells to the new tank site.

TECHNICAL ASSESSMENT:

The Town of Wibaux had a detailed water system analysis done in 1982 which evaluated the water works system, the deficiencies, and priorities for improving the deficiencies. In April 1988, the town hired a consulting engineering firm to prepare a preliminary engineering report that evaluated previous studies and outlined the scope of the necessary improvements. The town has a definite need to replace the storage reservoir because it is proving to be a big maintenance problem and becoming cost prohibitive to annually patch the leaks. The proposed project appears to be technically feasible and should solve some of Wibaux's immediate problems.

The design will be reviewed and approved by the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences before construction begins. The WQB agrees with the general concept of the proposed project and has ranked it in the top half of its list of priority projects.

FINANCIAL ASSESSMENT:

The total cost of the project is estimated at \$250,000. Of this total, \$215,900 is earmarked for construction and contingencies with the balance for legal and administrative costs. The applicant has requested a \$50,000 grant and a \$200,000 loan from DNRC. The estimated project costs appear to be reasonable and realistic, and the most cost-effective solution has been selected. The present average water user rates are \$8.17/user/month and are expected to raise to \$18.72/user/month to repay a \$250,000 loan with 10 percent interest and a 20 year term for the total project costs.

ENVIRONMENTAL ASSESSMENT:

Other than the short-term impacts typically associated with municipal construction projects, no adverse impacts are anticipated with this project.

RECOMMENDATION:

DNRC recommends a \$250,000 loan from the sale of coal severance tax bonds to be repaid over a maximum of 20 years. The interest rate shall be 2 percentage points below the rate at which the state bond is sold for the first 5 years, and at the coal severance tax bond rate for the remaining 15 years. Any reduction in the loan request will result in recalculation of the loan interest rate. This rate will be based on the annual water rates in relation to the median family income. Any reduction in project scope should not affect priority improvements. The town must also provide DNRC with proof of the deteriorated condition of the water storage reservoir.

The Water Development Loan and Grant Program limits grants for projects of this type to 25 percent of the total project costs up to \$50,000 with a total grant and loan combination of \$200,000. The town proposes to use \$250,000 of Department funds from two separate programs, which is contrary to Department policy. Because a Coal Severance Tax Bond is the appropriate funding mechanism for a project of this size, DNRC does not recommend a grant.

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APPLICANT NAME: Anaconda Deer Lodge City-County

PROJECT/ACTIVITY NAME: Anaconda Wastewater Treatment Plant  
Effluent Disposal

AMOUNT REQUESTED: \$100,000 - Grant  
\$152,439 - Public Loan

OTHER FUNDING SOURCES AND AMOUNTS: \$70,000 - 1985 RIT Grant  
\$967,316 - Construction  
Grants

TOTAL PROJECT COST: \$1,289,755

PROJECT DESCRIPTION:

In 1983, a waste-water treatment plant was constructed for the City of Anaconda-Deer Lodge. The system was proposed to be an aerated lagoon system with the effluent to be discharged into rapid infiltration ponds. Because of the presence of arsenic in the soils, EPA would not allow the infiltration part of the treatment system to be built. The treated effluent is now being discharged into Anaconda Minerals Co. tailings ponds where it evaporates. Because this practice interferes with final reclamation activities, the Anaconda Minerals Co. has asked the town to stop this practice and look for another alternative.

The engineering firm of Thomas, Dean & Hoskins, Inc. has conducted a study of alternatives for the disposal of effluent. Seven alternatives have been investigated and the recommended

alternative would use effluent for irrigation during the summer and discharge into the Warm Springs pond system in the winter. The Department of Health and Environmental Sciences (DHES) has reviewed this engineering study and has suggested the town investigate another, more environmentally sensitive alternative because of the complexity of the project due to its location (Clark Fork headwaters) and all the entities involved (EPA, DFWFP, DHES, Clark Fork Coalition, etc.). The alternative suggested by DHES includes rapid infiltration basins (outside of tailings area), storage, and/or irrigation. The town's engineering firm is working on this alternative and will not complete this work prior to DNRC project ranking.

TECHNICAL ASSESSMENT:

Clearly, the city must find an alternative to present wastewater disposal practices. However, the proposed project has been rejected by DHES since the time of application. Alternatives are being pursued by the city's consultant.

FINANCIAL ASSESSMENT:

No costs available.

ENVIRONMENTAL ASSESSMENT:

The proposed project has been rejected by DHES primarily for environmental reasons.

RECOMMENDATION:

Since the proposed project has been rejected by DHES, DNRC recommends no funding.





## CHAPTER III

### THE RENEWABLE RESOURCE DEVELOPMENT PROGRAM

#### A. Program Description and History

The Renewable Resource Development Program (RRD) was established by the Montana Legislature in 1975. (Authority: Title 90 Chapter 2 MCA). The law states that the purpose of the program is to "develop renewable natural resources that will preserve for the citizens the benefit of the state's natural heritage and to ensure that the quality of existing public resources such as land, air, water, fish, wildlife, and recreational opportunities are not significantly diminished by developments supported by this part." In order to do this, the Renewable Resources Development program may provide funds "for the purchase, lease, or construction of projects for the conservation, management, utilization, development, or preservation of the land, water, fish, wildlife, recreational, and other renewable resources in the state; for the purpose of feasibility and design studies for such projects; for development of plans for the rehabilitation, expansion, or modification of existing projects; and for such other and further similar purposes as the legislature may approve." Only public entities are eligible for the RRD program.

#### B. Program Funding

The funding source for the RRD program has historically been the coal severance tax. Initially the program received 2.5 percent of the half of the coal severance tax revenues not allocated to the constitutional trust fund. This equalled 1.25 percent of the entire coal severance tax. During the 1981 Legislature, the law was changed by S.B. 409. This bill reallocated one-half of the RRD revenues to the new Water Development Program. S.B. 373, approved by the 1987 Legislature, directed that beginning in FY90, 8 percent of the interest income from the resource indemnity trust fund be allocated to the RRD account.

From 1981 to 1988, RRD grant funds have been earmarked for the following project categories:

- 15 percent -- for timber stand improvement
- 40 percent -- for water development
- 15 percent -- for improvements on agricultural lands
- 10 percent -- for conservation districts for development of water reservations .

20 percent -- for other projects the department considers important

During the 1983 Legislature, H.B. 486 allocated 15 percent of the RRD funds from the last category called "Other" to the "Rangeland Resource Loan Program" until 1989. This program has been administered by the Conservation Districts Division of the DNRC.

The 1987 Legislature, through S.B. 373, repealed the RRD grant funding categories, beginning with the 1990-91 biennium.

### C. Program Administration and Project Review Procedures

The Montana Department of Natural Resources and Conservation administers the RRD program with procedures similar to those used for the Water Development Program. The department develops application forms and solicits applications for the program. The applications are submitted to DNRC in the even-numbered year prior to the beginning of the Montana legislative session. The application must include information to enable technical, environmental, economic, and financial feasibility assessments.

The department evaluates the proposals, and also solicits technical and financial review assistance from other entities with appropriate expertise such as local, state, and federal agencies, and universities.

After the project proposals are reviewed, DNRC ranks feasible projects and makes a funding recommendation for each proposal. The recommendations are presented to the Water Development Advisory Council for their consideration. The recommendations are then made to the governor who in turn makes his recommendation to the legislature. The legislature makes the final funding decision. Once the final funding decision is made, DNRC negotiates contracts with the project sponsors for project implementation. Like the water development contracts, RRD contracts include a detailed scope of work defining work to be accomplished, the completion schedule, and the project budget. The disbursement of funds is coordinated with the project schedule and budget as funds are available. Grant agreements also require periodic progress reports and final reports, which are used in conjunction with field visits, to monitor project progress and completion.

### D. Project Ranking and Funding Recommendation Procedure

The DNRC ranks feasible projects and develops a funding priority and funding level recommendation for the legislature. These priorities reflect the goals required by law for the use of RRD funds. These goals are:

1. to enhance public resources

2. to optimize public benefits
3. to promote conservation and efficient use of renewable resources

The DNRC and the Water Development Advisory Council have identified the following other criteria used to evaluate proposals. These are:

4. that there is a need and urgency for the project
5. that there is a potential for statewide application
6. that the project has not previously received funds (S.B. 373 made an exception to this criteria for projects that provide long-term compilation and management of natural resource information.)

The results of the ranking scores and funding recommendations for the RRD applications are shown in Table 2, and written project summaries follow the table. Like the Water Development Program, the RRD program also has a \$100,000 grant limit.

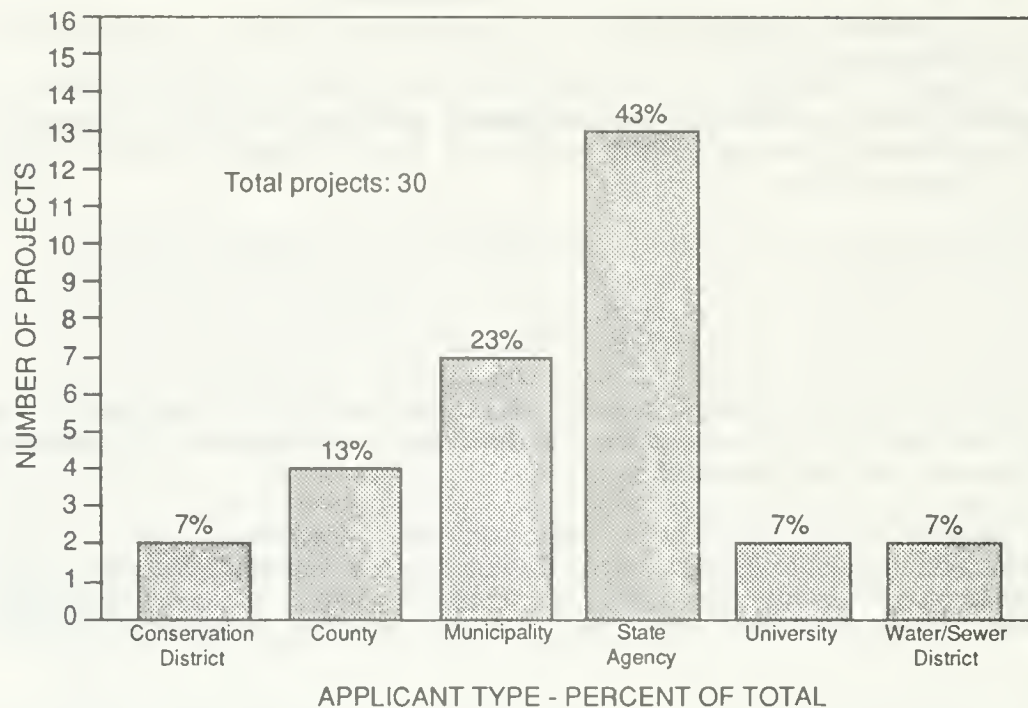
#### E. 1988 Grant Applications for RRD Funding in FY90-91

Of the total of 50 grant applications received in 1988, 46 were determined to be eligible for funding under the Renewable Resource Development program. As described under the Water Development program section in this report, the department assigned 30 of these applications for consideration under the RRD program. Table 3 lists the project applications in order of their priority ranking and provides the department's funding recommendation for each. Requested grant amounts for the 30 applications total \$2,316,391. Total projected revenues for FY90-91 are \$1,138,700. Based upon revenue projections, which are estimates and are subject to change, it appears that the first 18 project applications may receive funding.

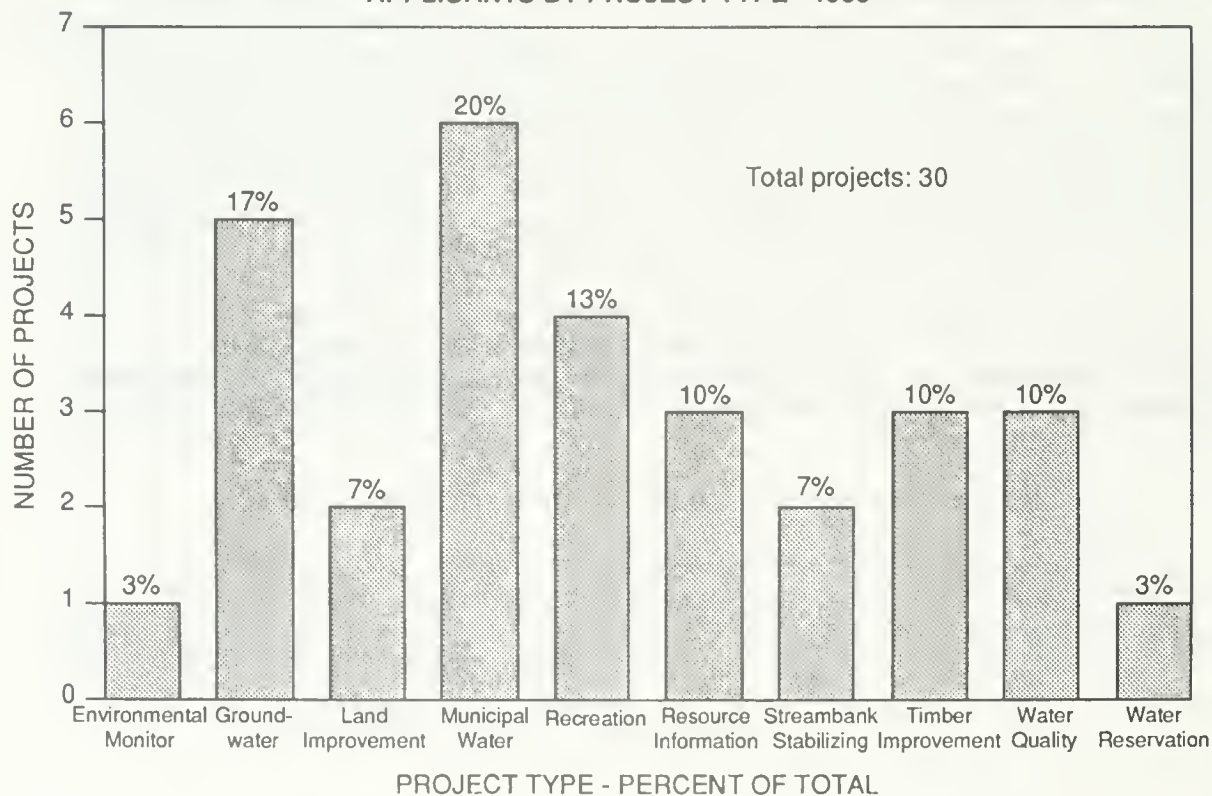
Figures 3.1 and 3.2 provide a breakdown of the RRD applications by the types of applicants submitting grant applications and by the types of project applications. Figure 3.3 depicts the amount of grant funds requested for the various project types in 1988.



**FIGURE 3.1**  
**RENEWABLE RESOURCE DEVELOPMENT PROGRAM**  
**APPLICATIONS BY APPLICANT TYPE - 1988**



**FIGURE 3.2**  
**RENEWABLE RESOURCE DEVELOPMENT PROGRAM**  
**APPLICANTS BY PROJECT TYPE - 1988**



**FIGURE 3.3**  
**RENEWABLE RESOURCE DEVELOPMENT PROGRAM**  
**REQUESTED FUNDING BY PROJECT TYPE - 1988**

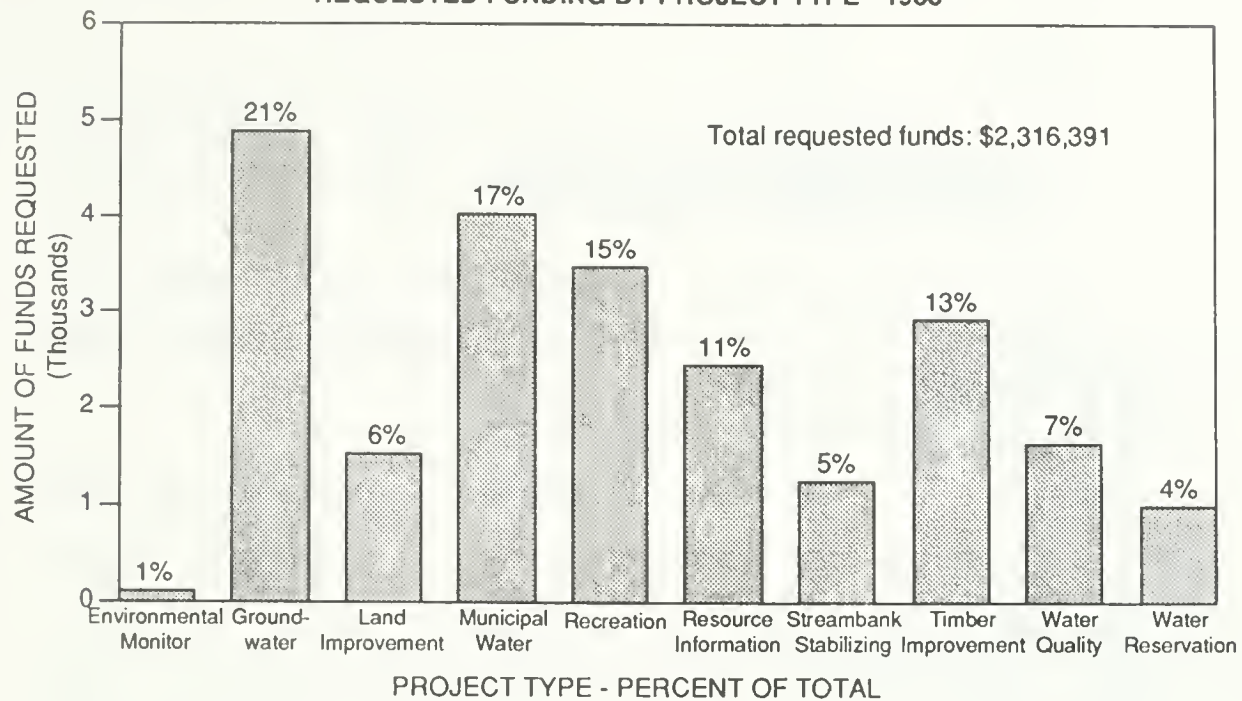


TABLE 3

## RENEWABLE RESOURCE DEVELOPMENT PROGRAM 1990-1991

## PRIORITY RANKING AND FUNDING RECOMMENDATIONS

APPLICANT	PROJECT NAME	PUBLIC BENEFIT	NEED AND URGENCY	STATEWIDE APPLICATION	PREVIOUS FUNDING	RENEWABLE RESOURCE DEV TOTAL	RECOMMENDED GRANT	RECOMMENDED LOAN	ACCUMULATIVE GRANT TOTAL
1 GALLATIN CONSERVATION DISTRICT	E. GALLATIN STATE RECREATION AREA	26	10	2	5	43	\$100,000		\$100,000
2 FLATHEAD BASIN COMMISSION	FOREST PRACTICES/WATER QUALITY CDDP PROGRAM	26	8	4	5	43	\$25,000		\$125,000
3 MONTANA STATE LIBRARY	MT NATURAL RESOURCE INFORMATION SYSTEM	24	9	5	5	43	\$99,806		\$224,806
4 MONTANA STATE LIBRARY	MONTANA WATER INFORMATION SYSTEM	23	8	5	5	41	\$45,510		\$270,316
5 MONTANA STATE LIBRARY	MONTANA NATURAL HERITAGE PROGRAM	22	7	5	5	39	\$99,450		\$369,766
6 UNIVERSITY OF MONTANA	MANAGEMENT GUIDELINES/RIPARIAN SITE TYPES	23	8	4	2	37	\$41,733		\$411,499
7 AGRICULTURE, MONTANA DEPT OF	MONITOR AG CHEMICALS IN GROUNDWATER	16	10	5	5	36	\$93,550		\$505,049
8 FLATHEAD VALLEY COMMUNITY COLL.	OUTDOOR EDUCATION AND CONFERENCE CENTER	20	5	4	5	34	\$72,000		\$577,049
9 LEWIS AND CLARK COUNTY	HYDROGEOLOGIC EVALUATION OF HELENA VALLEY	16	10	2	5	33	\$100,000		\$677,049
10 STATE LANDS, DEPT OF	PILOT URBAN FORESTRY PROJECT	19	4	4	5	32	\$60,000		\$737,049
11 BELGRADE, CITY OF	METER INSTALLATION & WATER MAIN REPLACEMENT	17	7	3	5	32	\$50,000	\$150,000	\$787,049
12 FISH, WILDLIFE & PARKS, DEPT. OF	WILDLIFE HABITAT/CONSERVATION RESERVE PROG	18	4	4	5	31	\$50,000		\$837,049
13 HYSHAM, TOWN OF	HYSHAM WATER SYSTEM IMPROVEMENT PROJECT	15	9	2	5	29	\$50,000	\$150,000	\$887,049
14 WHITEFISH CO. WATER & SEWER DIST	SWIFT CREEK CLAY BANKS STABILIZATION	16	6	2	5	29	\$73,440		\$960,489
15 MILES CITY, CITY OF	WATER DISTRIBUTION SYSTEM MASTER PLAN	15	7	2	5	29	\$16,500	\$66,380	\$976,989
16 EAST GLACIER WATER & SEWER DIST	MIDVALE CREEK DIVERSION	15	9	0	5	28	\$50,000		\$1,026,989
17 YELLOWSTONE COUNTY	VALLEY CREEK/CALAMITY JANE DAM FEAS. STUDY	17	4	2	5	28	\$10,000		\$1,036,989
18 GLASGOW, CITY OF	WATER & WASTEWATER MASTER PLAN	15	6	2	5	28	\$25,000		\$1,061,989
19 STATE LANDS, DEPT. OF	INTEGRATED FOREST RESOURCE INFO SYSTEM	15	5	2	5	27	\$89,121		\$1,151,110
20 COLUMBIA FALLS, CITY OF	MASTER WATER PLAN PHASE II	15	5	2	5	27	\$20,000		\$1,171,110
21 MISSOULA COUNTY	EMER RESPONSE/AQUIFER PROTECTION ENHANCEMENT	13	6	1	5	25	\$45,000		\$1,216,110
22 MSU-EASTERN AG RESEARCH CENTER	GROUNDWATER NITRATES UNDER IRRIGATED AG	10	8	2	5	25	\$10,700		\$1,226,810
23 ORNC-CONSERVATION DISTRICTS DIV	WATER RESERVATION DEVELOPMENT PROGRAM	10	7	5	4	24	\$32,000		\$1,258,810
24 CASCADIE COUNTY PARK BOARD	SILVER CREST CROSS COUNTRY SKI AREA	11	5	2	3	21	\$30,000		\$1,288,810
25 LEWIS AND CLARK COUNTY	VOLUNTARY AG LAND CONSERVATION PROGRAM	12	2	3	3	20	\$85,000		\$1,373,810
26 FLATHEAD CONSERVATION DISTRICT	FLATHEAD COUNTY GROUNDWATER STUDY	0	0	0	0	0	None		
27 MONTANA STATE UNIVERSITY	WATER QUALITY CRITERIA FOR RANGE WATERSHEDS	0	0	0	0	0	None		
28 MT BUREAU OF MINES & GEOLOGY	GROUNDWATER TRAINING CENTER	0	0	0	0	0	None		
29 STATE LANDS, DEPT OF	FORESTRY BMP EDUCATION PROJECT	0	0	0	0	0	None		
30 WHITEFISH CD WATER & SEWER DIST	GEOLOGY/GROUNDWATER RESOURCES	0	0	0	0	0	None		

TOTAL REQUESTED GRANTS-----\$2,316,391  
TOTAL PROJECTED REVENUES-----\$1,138,700

APPLICANT NAME: Gallatin Conservation District

PROJECT/ACTIVITY NAME: East Gallatin State Recreation  
Area/Bozeman Landfill

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: \$200,771 - Task Force  
(various contributions of  
labor and materials)  
\$3,629 - 223 Funds (DNRC)

TOTAL PROJECT COST: \$304,400

PROJECT DESCRIPTION:

Gallatin Conservation District is requesting grant funds to be used for further development and improvement of the East Gallatin State Recreation Area (SRA), formerly known as Glen Lake Park. The recreational site, much of it an abandoned landfill site along the East Gallatin River just north of Bozeman, is being managed cooperatively by the Department Fish, Wildlife and Parks, East Gallatin SRA Task Force, City of Bozeman, Gallatin County, and MSU Student Chapter of the Associated General Contractors (AGC). East Gallatin State Recreation Area was purchased in 1984 by the Montana Legislature through the Coal Tax Trust Parks Fund. An abandoned city landfill has been leased to the DFWP at no cost to further expand the SRA. Another 8 acre parcel was added through a subdivision parklands dedication to bring the SRA to a total of 83 acres.

In 1987 a citizens task force was formed to provide direction and technical and financial assistance in park development. To date, citizen volunteer help, such as for tree planting, and fence construction, has resulted in approximately \$42,000 in improvements for a cash outlay of about \$15,000 in materials. The City of Bozeman has made a 5 year commitment for daily litter pickup and security. Gallatin County has committed to providing security for a 5 year period, and the AGC students have agreed to provide park maintenance such as road grading and picnic table painting.

The end results of this project will be development of a safe, enjoyable, water-based parkland providing walking and jogging, nature study, fishing, cross-country skiing, boating, and other non-motorized recreation.

TECHNICAL ASSESSMENT:

A large portion of this SRA is underlain by an abandoned city landfill. Exposed landfill refuse is present and not adequately covered in many areas. The East Gallatin River needs to be stabilized to prevent streambank erosion into the landfill



material. Objectives of this project are to:

- 1) Stabilize the East Gallatin River, preventing erosion into the old landfill.
- 2) Remove burn, and/or cover landfill refuse.
- 3) Revegetate disturbed areas and control noxious weeds.
- 4) Develop the area for dispersed recreation in a natural setting.

Water quality degradation is a major concern of old landfill sites. High groundwater, Glen Lake, and the East Gallatin River may potentially be impacted by landfill leachates. The DHES Solid and Hazardous Waste Bureau and MSU have developed a water quality monitoring plan in conjunction with recommendations for park development. Samples analyzed to date indicate no elevated levels of deleterious materials in Glen Lake or the East Gallatin. A monitoring program is planned with \$2,000 budgeted for laboratory costs.

The DFWP and MSU student chapter of General Contractors Association will be responsible for providing technical assistance and maintenance for the project.

#### FINANCIAL ASSESSMENT:

The breakdown of the \$100,000 grant request is \$82,000 for materials and equipment, \$2,000 for water sampling, and \$16,000 for a project inspector. Gallatin Conservation District has received a "223" grant for \$3,629 for the project. The remainder of the total project costs are an estimated value of in-kind services of the participating entities and volunteer labor coordinated by the SRA task force. No DFWP Land and Water Conservation funds are presently available for park land development.

The estimates and projected budget appear to be reasonable and not excessive for the work anticipated.

#### ENVIRONMENTAL ASSESSMENT:

Environmental impacts should be beneficial because of the prevention of groundwater contamination from landfill leachates and the stabilization of the East Gallatin River banks.

#### RECOMMENDATION:

DNRC recommends a grant in the amount of \$100,000 contingent upon DNRC approval of the scope of work and budget. DNRC also encourages the task force to continue to seek additional volunteer support and donations.

APPLICANT NAME: Flathead Basin Commission

PROJECT/ACTIVITY NAME: Flathead Basin Forest Practices/Water  
Quality Cooperative Program

AMOUNT REQUESTED: \$25,000

OTHER FUNDING SOURCES AND AMOUNTS: \$130,000 - Flathead National  
Forest  
\$50,000 - Plum Creek Timber  
Co.  
\$25,000 - Other State  
Sources  
In-kind - University of  
Montana

TOTAL PROJECT COST: \$250,000

PROJECT DESCRIPTION:

The Flathead Basin Commission, established by the Montana Legislature to address resource issues and concerns in the Flathead area, is requesting RRD funding for partial support of a Forest Practices Cooperative Program. The cooperative program will be administered by the Flathead Basin Commission and coordinated by the major land and resource managing agencies, including the USFS Flathead National Forest, Department of State Lands Forestry Division, Plum Creek Timber Company, Department of Fish, Wildlife and Parks, the Water Quality Bureau at the Department of Health and Environmental Science, the Environmental Quality Council, and the University of Montana.

Specific objectives of the Cooperative Program are:

- 1) To document, evaluate and monitor the effects of forest practices on water quality and fisheries within the Flathead Basin, and
- 2) to develop criteria and administrative procedures for protecting water quality and fisheries from unacceptable impacts from timber harvest and management practices.

The rate of timber harvest has been accelerating on private and state lands in Montana, and the Forest Service is proposing to concentrate new logging and road building in headwater drainages often characterized by steep slopes and poorly developed soils. Concern over what may happen to state watersheds has been expressed through passage of HJR49 by the 1987 Legislature, appeals of forest plans, and increased public scrutiny of the Timber Management Program of the State Division of Forestry. It is becoming increasingly important for land managers and the public to have accurate information on the potential effects of forest practices on watershed values.

The cooperative program will consist of 7 major components, some of which have been initiated. The University of Montana will conduct much of the work for each component with coordination and assistance from the Flathead Basin Commission. The seven components of the cooperative program are:

- 1) Survey forest practices/problems by site evaluation procedures.
- 2) Assess risks of selected watersheds.
- 3) Develop a geographic information system approach to non-point source pollution control.
- 4) Develop management guidelines for riparian/wetland forests.
- 5) Review, evaluate, and compile existing historic data.
- 6) Conduct a literature review of pertinent information.
- 7) Design and implement a monitoring system that will provide quantitative answers to basic questions concerning the effects of forest management practices on fisheries and water quality in the Flathead Basin.

#### TECHNICAL ASSESSMENT:

Studies have been conducted in the past, especially under the 208 water quality planning effort, which identified sites and locations where forest practices were impairing water quality and associated uses. The intent of the Cooperative Forest Practices Program is to evaluate the effect of timber harvest practices on the impairment of water quality caused by sediment, and on other water quality parameters and other uses such as fisheries. In addition, actual recommendations for timber harvest improvements and implementation of a management plan will be developed.

On August 8, 1988, a Memorandum of Understanding was executed between the participants of this cooperative program which defines the goals and objectives and identifies responsibilities and commitments of each of the participants.

#### FINANCIAL ASSESSMENT:

Estimated total cost of the cooperative program is \$250,000. Commitments have been obtained from the USFS and Plum Creek Timber Co. for a total of \$180,000. The University of Montana will contribute an unspecified amount through in-kind services. Although not yet identified, it is anticipated an additional \$25,000 may be forthcoming from state agencies such as DHES or DFWP. The RRD grant request of \$25,000 represents approximately 10 percent of the total budget estimate.

Due to the rather broad scope of this program, it will be difficult to define and track the expenditure of the grant monies. The application does not describe specifically how the grant funds would be expended other than for support of the overall monitoring and evaluation program.

#### ENVIRONMENTAL ASSESSMENT:

This application is for a study to determine impacts of forestry practices and to recommend improvements to mitigate

identified problems. Environmental effects should be beneficial if recommendations are implemented.

RECOMMENDATION:

DNRC believes this program will improve forest practices not only in the Flathead Basin, but potentially statewide. DNRC recommends a grant in the amount of \$25,000 contingent upon approval of scope of work and budget.

- 3 -

APPLICANT NAME: Montana State Library

PROJECT/ACTIVITY NAME: Montana Natural Resource Information System

AMOUNT REQUESTED: \$99,806

OTHER FUNDING SOURCES AND AMOUNTS: No matching funds are secured at this time, but the library expects some funds through action during the 1989 Legislature.

TOTAL PROJECT COST: \$482,268

PROJECT DESCRIPTION:

The primary purpose of the Montana Natural Resource Information System (NRIS) is to improve statewide efforts to manage existing natural resource data and make existing data sources more accessible. NRIS is designed to help data users avoid increasing collection and management costs and ensure that the best available natural resource information is readily at hand for critical resource decisions.

The Natural Resource Information System will accomplish this goal through the following objectives:

1. Maintain and expand the automated geographical and subject area indexing system (the Montana Natural Resource Index) for existing data sources (including both published and unpublished sources and files)
2. Participate in the design and development of uniform, easily accessible, statewide databases such as the Montana Water Information System for each of Montana's natural resources
3. Manage a timely, cost-effective clearinghouse and



referral service to link users with the best sources of information

4. Negotiate cooperative agreements with state and federal agencies to secure support for project goals and to provide specific data management services that are consistent with project goals
5. Administer the Montana Natural Heritage Program, a database of detailed information on Montana's rare plants, animals, and plant communities
6. Participate in the design and development of a geographic information system (GIS) to serve state needs
7. Market and promote the use of NRIS, including all of its related databases
8. Evaluate the programs on an ongoing basis and produce status reports as requested and as specified in various contracts

The proposed project is designed to provide for the long-term management and compilation of natural resource information on behalf of public and private users. As such, the project will contribute to an increased understanding of the state's renewable resources, and, consistent with the purpose of the Renewable Resource Development Grant Program, the project will provide an increased ability to apply this knowledge to the conservation, management, utilization, development, and preservation of the water, land, vegetation, fish, wildlife, recreational, and other renewable resources in the state.

#### TECHNICAL ASSESSMENT:

The Montana Natural Resource Information System (NRIS) was created by the Montana Legislature to promote better management and sharing of information among resource users. Guidance for NRIS is provided by the legislatively-created Montana Natural Resource Data System Advisory Committee, which consists of delegates from the ten major natural resource agencies within state government. All major federal natural resource agencies have been invited to appoint a delegate to serve as an ad hoc representative on this Committee.

A 1986 survey of natural resource users conducted by NRIS showed a need for a centralized system to provide access to natural resource information. A first step in meeting this goal was the development of a standardized indexing system. Information sources are indexed both by subject area and geographic area of coverage. Nearly 9,000 citations have been indexed by the system. This includes many unpublished documents, maps, and data files.

The NRIS program also provides a clearinghouse and referral service. During the initial two and a half year start-up, the

program has responded to approximately 600 data and information requests mainly from state agencies, private consultants, and federal agencies. Data requests are expected to continue to increase as the databases grow and the indexing system matures. It is expected that NRIS will receive and respond to more than 200 data requests per year in the next biennium.

The NRIS program is also responsible for administering the Geographic Information System (GIS), the Montana Water Information System (MWIS), and the Montana Natural Heritage Program.

The NRIS staff consists of six full-time employees: program director, Geographic Information System officer, water information specialist, research assistant II (under the GIS officer), and two library technicians. The Natural Heritage Program consists of four full-time employees provided by The Nature Conservancy through a contract administered by NRIS.

Most tasks are ongoing, but there are several specific milestones which are scheduled for completion at a certain time as illustrated in the project timeline. Under the current RIT contract for this program, specific goals for each objective have been identified (e.g., collect and input at least 500 records per year into the indexing system). Setting specific goals for each activity is recommended for this project.

#### FINANCIAL ASSESSMENT:

The proposed budget reflects continued funding at the present level for two years. The total budget for the NRIS program for this period is \$482,268.

This grant request is \$99,806 to support 60 percent of the NRIS director's salary and program operating expenses and 40 percent of the water information specialist's and technician's salaries. The budget assumes no increases for salaries.

The NRIS program has received funding in the past from the following sources:

STATE FUNDS	<u>1986/87</u>	<u>1988/89</u>
Dept. of Natural Resources & Conserv.		
(Resources Indemnity Trust grant)	\$225,561	\$177,970
(Water Development grant)		97,712
Dept. of Fish, Wildlife & Parks		
(License fees)	75,000	50,000
FEDERAL FUNDS		
Dept. of Health & Environ. Sciences		
(Environmental Protection Agency)		314,145
Dept. of State Lands		
(Office of Surface Mining)	150,000	30,000
Montana Rivers Study (FWP)		
(Bonneville Power Admin.)	15,214	37,944
Other (USF&WS, USFS)	24,500	28,700
PRIVATE	<u>75,140</u>	<u>22,637</u>

TOTALS:

\$565,415

\$759,108

The following sources are being pursued for funding in the 1990/91 biennium.

Carry-over Funds - Of the \$759,108 obtained for the 1988-89 biennium, approximately \$35,000 is expected to be carried forward into FY90 to complete work.

General Funds - General funds in the amount of \$66,388.

Office of Surface Mining - The Office of Surface Mining will provide a minimum of \$30,000 with expectations to increase the level somewhat.

Department of Fish, Wildlife and Parks (License fees) - Although no amount has been specified, a minimum of \$50,000 is expected, sustaining current levels.

Private Funding/Subscription Fees - The Nature Conservancy has not made a formal commitment for FY90-91 funding. As for other private, non-firm sources, it is estimated that \$25,000 in user subscription fees or small data management contracts will be obtained by NRIS during the 1990-91 biennium.

The NRIS program will continue to solicit other outside sources of funding; as the data system matures, a schedule of user fees for non-state agency users will be considered. However, user fees may affect state economic development to the extent that they would prevent entrepreneurs and developers from gaining access to information needed to support new projects. Consequently, it is believed that subscription fees and small service contracts are better alternatives than individual transaction fees, and NRIS will be exploring the possibility of selling subscriptions to and/or negotiating contracts with frequent users.

Department of Health and Environmental Sciences - NRIS has secured a FY88 contract for \$152,523 and a FY89 contract for \$214,963 to develop a Geographic Information System (GIS) in support of the Department of Health and Environmental Sciences (DHES) and Environmental Protection Agency (EPA) Clark Fork Superfund Project. The project is funded through September 1989 with negotiations underway to continue the effort through at least September 30, 1991.

Montana Rivers Study (DFWP Interagency Agreement) - NRIS secured \$25,944 for FY88. This contract will be amended for FY89 with an additional \$12,000 for a total of \$37,944 for the 1988-89 biennium. This project is expected to be funded for an additional two years (FY90 and 91).

Renewable Resources Grant - Core Natural Resource Information system - \$99,806 for FY90 and 91. Core Natural Heritage Program -

\$99,450 for FY90 and 91.

Reclamation and Development Grant - Core Natural Heritage Program - \$197,607 for FY90 and 91.

Water Development Grant - \$45,510 for FY90 and 91.

ENVIRONMENTAL ASSESSMENT:

The proposed project will not result in the construction of facilities, nor any activity that will have a direct negative impact on the environment. The proposed project is designed to provide for the long-term management and compilation of information on natural resources on behalf of public and private users. Significant positive impacts are expected to result from the project as a result of an increased understanding of the state's renewable resources and an increased ability to apply this knowledge to the conservation, management, utilization, development, and preservation of the water, land, vegetation, fish, wildlife, recreational, and other renewable resources in the state. In particular, the project will have the effect of reducing environmental impacts of future natural resource projects statewide.

RECOMMENDATIONS:

DNRC recommends a grant in the amount of \$99,806 contingent upon DNRC approval of the scope of work and budget.

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APPLICANT NAME: Montana State Library

PROJECT/ACTIVITY NAME: Montana Water Information System

AMOUNT REQUESTED: \$45,510

OTHER FUNDING SOURCES AND AMOUNTS: No matching funds are secured at this time, but the library expects some funds through action during the 1989 Legislature.

TOTAL PROJECT COST: \$81,440

PROJECT DESCRIPTION:

Work to build a water resources data management system for Montana began in 1985 as a joint project between the Natural Resource Information System (NRIS) and the Department of Natural Resources and Conservation (DNRC). The first step of this cooperative development effort was to create an advisory



committee composed of delegates from each of the major water data collection and management state agencies. This committee was formed to help insure that the system would serve these agencies effectively.

After meeting several times in 1986, the advisory committee recommended that a central access point to decentralized data sources should be developed. In other words, Montana's water data management system would not be an expensive, complex central data storage facility but rather an efficient means to identify sources of important data and coordinate access to those sources. This user-oriented strategy, which is quite similar to how NRIS functions, enables each agency to continue managing their own data to meet their own specific needs, but at the same time allows for maximum sharing of water data among participating agencies. NRIS, in cooperation with DNRC, was selected as the lead agency to design and implement the system, which is now called the Montana Water Information System or MWIS.

The development of the system has been designed in two phases. Phase 1 is designed to establish the system and make it fully operational by the fall of 1989. At that point, an effective system will be in place, tailored to Montana's needs and serving public and private users. The Water Information System will be an ongoing function of the NRIS program.

Phase 2 is designed to maintain the system and promote its use among the agencies and organizations it is intended to serve, and also to strengthen the operational status of the system to ensure long-term use. The objectives of the project are to refine and strengthen the system and to maintain its benefits.

#### TECHNICAL ASSESSMENT:

This project will be managed by the NRIS water information specialist with technical and clerical support from the library technician assigned to MWIS, and some assistance from the NRIS director. Project work will be guided by the MWIS advisory committee which will be expanded to include experts on Geographic Information Systems. The four major goals are:

1. Montana State Library and Natural Resource Information System staff cross-training and training for frequent users within water management agencies and from the private sector
2. MWIS network-remote, on-line access
3. Data collection project tracking system
4. Coordinate use of new information management tools

The above improvements to MWIS should increase and expand its utility to users. Users will be able to access MWIS by either placing an information request with the MWIS staff or through direct access to water data bases by using the additional MWIS computer available to the public. MWIS will continue to be refined and should result in more efficient use of funds directed to water resource management organizations.

#### FINANCIAL ASSESSMENT:

The State Library will house the project. The total budget of \$45,510 includes: \$36,950 for salaries and benefits; \$4,060 for administrative costs; \$2,500 for an additional computer and software; and \$2,000 for travel.

Development of MWIS is currently funded by a Water Development Grant of \$97,712 for the 88/89 biennium. MWIS is designed to help data users avoid increasing data collection and management costs. Private funding will continue to be sought for a portion of ongoing costs. In other states operating such programs, funds have been secured from the federal government and from private sources. In Montana, the Water Information System has become an integral part of the NRIS program, and portions of several NRIS funding sources are used to support the Water Information System.

The NRIS program has received funding in the past from the following sources:

STATE FUNDS	<u>1986/87</u>	<u>1988/89</u>
Dept. of Natural Resources & Conserv.		
(Resources Indemnity Trust grant)	\$225,561	\$177,970
(Water Development grant)		97,712
Dept. of Fish, Wildlife & Parks		
(License fees)	75,000	50,000
 FEDERAL FUNDS		
Dept. of Health & Environ. Sciences		
(Environmental Protection Agency)		314,145
Dept. of State Lands		
(Office of Surface Mining)	150,000	30,000
Montana Rivers Study (FWP)		
(Bonneville Power Admin.)	15,214	37,944
Other (USF&WS, USFS)	24,500	28,700
 PRIVATE	<u>75,140</u>	<u>22,637</u>
 TOTALS:	\$565,415	\$759,108

The following sources are being pursued for funding in the 1990-91 biennium.

Carry-over Funds - Of the \$759,108 obtained for the 1988-89 biennium, approximately \$35,000 is expected to be carried forward into FY90 to complete work.

General Funds - General funds in the amount of \$66,388.

Office of Surface Mining - The Office of Surface Mining will provide a minimum of \$30,000 with expectatons to increase the level somewhat.

Department of Fish, Wildlife and Parks (License fees) - Although no amount has been specified, a minimum of \$50,000 is expected, sustaining current levels.

Private Funding/Subscription Fees - The Nature Conservancy has not made a formal commitment for FY90-91 funding. As for other private, non-firm sources, it is estimated that \$25,000 in user subscription fees or small data management contracts will be obtained by NRIS during the 1990-91 biennium.

The NRIS program will continue to solicit other outside sources of funding; as the data system matures, a schedule of user fees for non-state agency users will be considered. However, user fees may affect state economic development to the extent that they would prevent entrepreneurs and developers from gaining access to information needed to support new projects. Consequently, it is believed that subscription fees and small service contracts are better alternatives than individual transaction fees, and NRIS will be exploring the possibility of selling subscriptions to and/or negotiating contracts with frequent users.

Department of Health and Environmental Sciences - NRIS has secured a FY88 contract for \$152,523 and a FY89 contract for \$214,963 to develop a Geographic Information System (GIS) in support of the Department of Health and Environmental Sciences (DHES) and Environmental Protection Agency (EPA) Clark Fork Superfund Project. The project is funded through September 1989 with negotiations underway to continue the effort through at least September 30, 1991.

Montana Rivers Study (DFWP Interagency Agreement) - NRIS secured \$25,944 for FY88. This contract will be amended for FY89 with an additional \$12,000 for a total of \$37,944 for the 1988-89 biennium. This project is expected to be funded for an additional two years (FY90 and 91).

Renewable Resources Grant - Core Natural Resource Information System - \$99,806 for FY90 and 91. Core Natural Heritage Program - \$99,450 for FY90 and 91.

Reclamation and Development Grant - Core Natural Heritage Program - \$197,607 for FY90 and 91.

Water Development Grant - \$45,510 for FY90 and 91.

#### ENVIRONMENTAL ASSESSMENT:

The proposed project will not result in the construction of facilities, nor any activity that will have a direct negative impact on the environment. The proposed project is designed to provide for the long-term management and compilation of information on natural resources on behalf of public and private users. Significant positive impacts are expected to result from the project as a result of an increased understanding of the state's renewable resources and an increased ability to apply

this knowledge to the conservation, management, utilization, development, and preservation of the water, land, vegetation, fish, wildlife, recreational, and other renewable resources in the state. In particular, the project will have the effect of reducing environmental impacts of future natural resource projects statewide.

RECOMMENDATION:

DNRC recommends a grant of \$45,510 contingent upon DNRC approval of scope of work and budget.

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APPLICANT NAME: Montana State Library

PROJECT/ACTIVITY NAME: Montana Natural Heritage Program

AMOUNT REQUESTED: \$99,450

OTHER FUNDING SOURCES AND AMOUNTS: No matching funds are secured at this time, but the library expects some funds through action during the 1989 Legislature.

TOTAL PROJECT COST: \$297,057

PROJECT DESCRIPTION:

The Natural Heritage Program provides a comprehensive inventory of significant elements of the state's natural features that are exemplary, rare, or endangered at the state or national level. These elements include plant and animal species, plant communities, aquatic systems, critical habitats and other ecological features of significance, and geological features.

The inventory data are compiled from detailed review of published and unpublished sources, as well as from agencies, organizations, the scientific community, and individuals. This is followed by a continual update and refinement of the information, including field surveys. Data are obtained on the occurrences, number, condition, endangerment, location, and land ownership status of significant elements (rare or exemplary plants, animals, and communities). The data are stored in an integrated data management system. Map files, manual files, and computer files keep the information well organized and readily accessible.

Heritage methodology and goals assure that data are unbiased, comprehensive, and accurate. The program provides a non-confrontational approach to conflict resolution for natural resource issues. This system of information acquisition, storage, and retrieval provides comprehensive and accurate data for wise resource management and development. The resulting data base is particularly useful when a defined geographic area must



be studied for preparing environmental impact statements or planning for facility siting or reclamation.

#### TECHNICAL ASSESSMENT:

This project will be operated under contract with The Nature Conservancy with the staff working with the Natural Resource Information System (NRIS) at the State Library. The project is managed by a coordinator, who serves as the contractor's liaison to the state and as the project zoologist. Other staff include a botanist, community ecologist, and data manager. Work is guided by the contract with the State Library and input from the NRIS Advisory Committee.

The Montana Natural Heritage Program plans are to:

1. Continue to update the ranked checklist of all Montana vertebrates and of high-ranking plants. Ranks are based on the system utilized by The Nature Conservancy in 49 other heritage programs throughout the United States;
2. Maintain and continue to revise the list of more than 600 computerized abstracts on each vertebrate in the state;
3. Revise, update and expand the site-specific element occurrence records, the present level is 1,905;
4. Continue to update and expand the listing of more than 2,200 pertinent secondary sources of information;
5. Provide a status report on the more than 1,900 high-ranked elements processed into the system; maintain access to the data base containing these elements; and provide output organized by county, by latitude and longitude, or by township, range, and section.

The Heritage Program provides a valuable data service to a variety of state, federal, and private users. Providing timely, cost-effective, natural resource information leads to more efficient resource planning, conflict resolution, and impact statement review. Training materials and demonstrations will be provided to users and a direct access mode of service is being evaluated for potential use.

#### FINANCIAL ASSESSMENT:

The proposed budget reflects continued funding at the present level for two years. The total budget for the NRIS program, including the Heritage Program, for this period is \$482,268.

This grant requests \$99,450 to support 34 percent of the Natural Heritage Program (NHP) staff and approximately 5 percent of the NRIS support staff and operating expenses. This budget assumes no increases for salaries. The total budget for the Heritage Program is \$297,057.

The NRIS program has received funding in the past from the following sources:

STATE FUNDS	<u>1986/87</u>	<u>1988/89</u>
Dept. of Natural Resources & Conserv.		
(Resources Indemnity Trust grant)	\$225,561	\$177,970
(Water Development grant)		97,712
Dept. of Fish, Wildlife & Parks		
(License fees)	75,000	50,000
 FEDERAL FUNDS		
Dept. of Health & Environ. Sciences		
(Environmental Protection Agency)		314,145
Dept. of State Lands		
(Office of Surface Mining)	150,000	30,000
Montana Rivers Study (FWP)		
(Bonneville Power Admin.)	15,214	37,944
Other (USF&WS, USFS)	24,500	28,700
 PRIVATE	<u>75,140</u>	<u>22,637</u>
 TOTALS:	\$565,415	\$759,108

The following sources are being pursued for funding in the 1990-91 biennium.

Carry-over Funds - Of the \$759,108 obtained for the 1988-89 biennium, approximately \$35,000 is expected to be carried forward into FY90 to complete work.

General Funds - General funds in the amount of \$66,388.

Office of Surface Mining - The Office of Surface Mining will provide a minimum of \$30,000 with expectatons to increase the level somewhat.

Department of Fish, Wildlife and Parks (License fees) - Although no amount has been specified, a minimum of \$50,000 is expected, sustaining current levels.

Private Funding/Subscription Fees - The Nature Conservancy has not made a formal commitment for FY90-91 funding. As for other private, non-firm sources, it is estimated that \$25,000 in user subscription fees or small data management contracts will be obtained by NRIS during the 1990-91 biennium.

The NRIS program will continue to solicit other outside sources of funding; as the data system matures, a schedule of user fees for non-state agency users will be considered. However, user fees may affect state economic development to the extent that they would prevent entrepreneurs and developers from gaining access to information needed to support new projects. Consequently, it is believed that subscription fees and small service contracts are better alternatives than individual transaction fees, and NRIS will be exploring the possibility of selling subscriptions to and/or negotiating contracts with

frequent users.

Department of Health and Environmental Sciences - NRIS has secured a FY88 contract for \$152,523 and a FY89 contract for \$214,963 to develop a Geographic Information System (GIS) in support of the Department of Health and Environmental Sciences (DHES) and Environmental Protection Agency (EPA) Clark Fork Superfund Project. the project is funded through September 1989 with negotiations underway to continue the effort through at least September 30, 1991.

Montana Rivers Study (DFWP Interagency Agreement) - NRIS secured \$25,944 for FY88. This contract will be amended for FY89 with an additional \$12,000 for a total of \$37,944 for the 1988-89 biennium. This project is expected to be funded for an additional two years (FY90 and 91).

Renewable Resources Grant - Core Natural Resource Information System - \$99,806 for FY90 and 91. Core Natural Heritage Program - \$99,450 for FY90 and 91.

Reclamation and Development Grant - Core Natural Heritage Program - \$197,607 for FY90 and 91.

Water Development Grant - \$45,510 for FY90 and 91.

#### ENVIRONMENTAL ASSESSMENT:

The proposed project will not result in the construction of facilities, nor any activity that will have a direct negative impact on the environment. The proposed project is designed to provide for the long-term management and compilation of information on natural resources on behalf of public and private users. Significant positive impacts are expected to result from the project as a result of an increased understanding of the state's renewable resources and an increased ability to apply this knowledge to the conservation, management, utilization, development and preservation of the water, land, vegetation, fish, wildlife, recreational, and other renewable resources in the state. In particular, the project will have the effect of reducing environmental impacts of future natural resource projects statewide.

#### RECOMMENDATION:

DNRC recommends a grant in the amount of \$99,450 contingent upon DNRC approval of the scope of work and budget.

APPLICANT NAME: University of Montana

PROJECT/ACTIVITY NAME: Management Guidelines for Riparian Site  
Types of Montana

AMOUNT REQUESTED: \$49,519

OTHER FUNDING SOURCES AND AMOUNTS: \$147,200 Montana Riparian  
Association

TOTAL PROJECT COST: \$196,719

PROJECT DESCRIPTION:

The Montana Forest and Conservation Experiment Station of the University of Montana School of Forestry is requesting funding to continue and complete efforts to develop management guidelines for riparian areas based on riparian vegetation dominance types. The experiment station, under direction of the Montana Riparian Association, (MRA) has developed and published a taxonomic classification system of Riparian Dominance Types of Montana, which is the foundation for determining management strategies on the various riparian site types.

In 1985, the Water Development Program funded a proposal by the UM School of Forestry to develop a riparian dominance type classification and pursue the formation of an interagency cooperative. The first organizational meeting for the Montana Riparian Association was held in April 1986, followed by the first annual technical riparian workshop in June 1986. The MRA Charter was formally signed on June 4, 1986. Cooperating members of the MRA include: the USDA Forest Service and Soil Conservation Service; USDI Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, Fish and Wildlife Service, and National Park Service; the EPA; the Montana Department of Fish, Wildlife and Parks, Montana Department of State Lands, Montana State University, and the University of Montana; The Nature Conservancy, Champion Timberlands, Western Energy Company and the Montana Association of State Grazing Districts.

The overall purpose of this proposal is to provide land resource managers and land owners with the knowledge and techniques they need to properly identify and manage riparian areas. Specific objectives to be accomplished during the grant period are:

- 1) To complete a statewide riparian site type publication to assist in the identification, description, and management of riparian areas by landowners and managers.
- 2) To develop a summary of recommended management practices for the riparian site types identified in Montana.



- 3) To provide training and continuing education in the identification and proper management of riparian areas. Results of this project in 1991 will include:
  - 1) publication of riparian identification and management guidelines for all areas of the state,
  - 2) distribution of education materials pertaining to riparian management,
  - 3) annual workshops and training sessions presented for landowners and managers,
  - 4) riparian information and management guidelines compiled by the MRA may serve as a technical basis for possible legislation regarding water quantity and quality and related resource management problems.

#### TECHNICAL ASSESSMENT:

Riparian areas are important oases of diversity within extensive upland ecosystems. They are of prime importance to water quality, water quantity, stream stability, and fisheries habitat. Most sites provide critical habitat needs for many species and they support a greater concentration of wildlife species and recreational activities than any other type of location on the landscape. Riparian areas are vital to both private enterprise and public concern. Because of this, riparian areas are focal points for water, livestock, timber and wildlife management. Management strategies that recognize all resource values must be developed to maintain or restore the integrity of riparian communities.

The activities of the Montana Forest and Conservation Experiment Station, as a member of the Montana Riparian Association, have included publication of a taxonomic key to riparian dominance types of Montana and a draft of management guidelines for riparian areas in southwestern Montana. The effort of the Montana Riparian Association is the first and only statewide effort to address riparian management guidelines in the western United States. It has broad support across Montana from state, federal, and private land management groups and agencies.

#### FINANCIAL ASSESSMENT:

The proposed budget for the 2-year period of funding is developed as a cost-share project with the MRA. Major funding will come from the various member agencies and organizations of the MRA. Special BLM and McIntire-Stennis funds are helping to maintain the program during FY88, but may not be available for FY89/90. Approximately \$69,600 per year is the maximum expected from the participating agencies. The proposed funding request will support a half-time research assistant, a field technical assistant, travel, supplies, and other expenses. The budget also includes \$7,786 for indirect costs.

#### ENVIRONMENTAL ASSESSMENT:

This project itself will have no environmental impact. However, better understanding and management of riparian areas will have beneficial effects.

RECOMMENDATION:

DNRC recommends a grant in the amount of \$41,733 contingent upon DNRC approval of scope of work and budget. The reduced amount reflects a decrease of \$7,786 in indirect costs.

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APPLICANT NAME: Montana Department of Agriculture

PROJECT/ACTIVITY NAME: Establishment of Monitoring Network to  
Assess the Extent of Agricultural  
Chemicals in Ground water

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: \$22,434 - Department  
Agriculture  
\$12,035 - Montana Bureau  
Mines & Geology  
\$21,885 - Montana State  
University

TOTAL PROJECT COST: \$156,354

PROJECT DESCRIPTION:

The Department of Agriculture, in cooperation with the Montana Bureau of Mines and Geology and Montana State University, is proposing to establish a groundwater quality monitoring network to sample for the presence of agricultural chemicals and nitrates. The goal of the project is to establish a groundwater monitoring network to assess contamination of Montana's groundwater by agricultural chemicals in at least six sites statewide. Soils and hydrogeology at each site will be characterized to provide a better understanding of the potential for pesticide movement in a number of hydrogeologic terrains common to Montana. In addition, a history of pesticide use will be determined at each of the selected sites.

Potential selected monitoring sites include the Dagmar Outwash Channel in Northeast Montana, the Fairfield Bench area in Teton County, the Highwood Bench area in Chouteau County, the Larslan area in Valley County, the Turner-Hogeland area in Blaine County, the Townsend Valley in Broadwater County, the Edgar area in Yellowstone County, and the Power-Dutton areas of Cascade and Teton counties.

The Department of Agriculture will have the primary responsibility of project management and sample analysis as well as joint responsibility for determination of pesticide use patterns and sample collection. The Bureau of Mines and Geology will provide the hydrogeologic characterization of each monitoring site, evaluate the potential for use of nitrate as an indicator of pesticide flux, and share the responsibility for

sample collection. Montana State University will provide the characterization of the soils located at each monitoring site and assist in determining pesticide use and cropping patterns.

#### TECHNICAL ASSESSMENT:

Past sampling efforts by the Montana Department of Agriculture have identified the presence of pesticides, including aldicarb; 2,4,-D; dicamba; MCPA; and picloram in a number of locations across the state. To put the problem in its proper perspective as well as to help quantify the magnitude of the problem, additional groundwater sampling needs to be conducted. Appropriate interpretations of sample analysis results depend on a thorough understanding of the local hydrogeology, soils, and pesticide use patterns.

The selection of each of the sites as a part of the groundwater monitoring network will be based on: 1) agricultural chemical use patterns, 2) an assessment of the physical and chemical characteristics of various pesticides and their mobility and persistence in soils and groundwater, 3) the proximity to groundwater, 4) local groundwater gradients in the area, and 5) the soils present in the area.

At each site, three to five monitoring wells will be installed at selected locations. Well casing will be a combination of stainless steel and PVC. During well construction, soils will be logged and samples collected to establish initial concentrations of pesticides in the soil profile.

Flood plots will also be constructed at each site to assess both the saturated hydraulic conductivity and the dependence of hydraulic conductivity on moisture content of the soil. At least two neutron access tubes will be installed at each flood plot to determine hydraulic conductivity.

To assess the possibility of using nitrate as an indicator of agricultural chemical movement, nitrate levels will be monitored weekly at two of the six sites during each of the two spring periods. Simultaneously, samples will also be collected and analyzed for pesticides. It may be that some type of relationship can be established between nitrate movement and pesticide leaching that would allow the use of nitrate fluctuations as an indicator of pesticide movement.

#### FINANCIAL ASSESSMENT:

Approximately 50 percent of the requested funds would be used for salaries. A chemist, located at Montana State University, would be hired to provide analytical support over the two spring periods covered by the proposed project time frame. Funds would also be used to support a hydrogeologist at the Montana Bureau of Mines and Geology and a soil scientist at Montana State University. Requested grant funds will additionally be used as follows: \$20,200 for well drilling and casing; \$17,510 for travel and associated project costs; and \$6,450 for indirect costs.

The requested budget will fund the project for two years. Other funding sources must be identified for additional sampling and monitoring beyond the initial two-year time frame.

ENVIRONMENTAL ASSESSMENT:

No adverse environmental effects will occur as a result of this monitoring project; however, the results of the groundwater monitoring may lead to protection of groundwater resources.

RECOMMENDATION:

A grant of \$93,550 is recommended (\$100,000 less \$6,450 indirect costs) contingent upon DNRC approval of the scope of work and budget. The scope of work must include specific identification of the monitoring sites and agricultural chemicals.

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APPLICANT NAME: Flathead Valley Community College

PROJECT/ACTIVITY NAME: Establishment of an Outdoor Education and Conference Center at the Former Big Creek Ranger Station

AMOUNT REQUESTED: \$72,000

OTHER FUNDING SOURCES AND AMOUNTS:

\$18,500 -	The Glacier Institute
\$16,000 -	Flathead National Forest
\$4,000 -	Glacier National Park
\$3,000 -	Glacier National Hist. Assn.
\$10,000 -	Flathead Valley Community College (in-kind)

TOTAL PROJECT COST: \$123,500

PROJECT DESCRIPTION:

Flathead Valley Community College, (FVCC) in cooperation with The Glacier Institute, is seeking a grant to initiate educational programs and management conferences at the former Big Creek Ranger Station which will focus on the northern Rocky Mountain ecosystem. The educational programming at Big Creek will include, but not be limited to, outdoor science education for elementary school children, teacher education courses, programs for the disadvantaged, senior citizen events, and programs and events for higher education. Programming for foreign audiences will also be developed.

The resource management conferences will seek to bring representatives of federal, state, and local agencies together with a wide spectrum of citizens and special interest groups to



move toward integrated solutions to the management of the northern Rocky Mountain ecosystem. This ecosystem comprises an area including Glacier National Park, Waterton Lakes National Park, portions of the Flathead and Lewis and Clark National Forests, Montana state lands, Blackfeet and Salish-Kootenai tribal lands, and significant private individual and corporate holdings. Smaller conferences and working group sessions at Big Creek will deal with either area-specific or resource-specific issues such as game and fisheries management, threatened and endangered species, water quality, mineral resource development, and Wild and Scenic River management.

#### TECHNICAL ASSESSMENT:

The Glacier Institute, in its fifth year of existence, is a private, non-profit organization developed as an educational outreach organization for making participants more aware of the cultural, physical, and biological resources of Glacier National Park and the surrounding region. The Glacier Institute has been working cooperatively with Flathead Valley Community College, Glacier National Park, and the Glacier National History Association. In May 1988, the U.S. Forest Service granted a special use permit to The Glacier Institute for use of the Big Creek Ranger Station as an outdoor education and conference center. The Big Creek Ranger Station is located on the North Fork of the Flathead River. The Glacier Institute, in its four full years of operation, has been conducting summer seminars at the YCC camp near Apgar Campground within Glacier National Park. With an initial enrollment of 160 students, the numbers of students/participants has nearly doubled to over 300. Approximately 50 percent of the institute's students are teachers, of which one half are from Montana. The others come from out of state.

The acquisition of the Big Creek Ranger Station will allow The Glacier Institute to hold more numerous year-round conferences and educational programs. The institute will serve as host and mediator for a minimum of eight smaller conferences (at least one per quarter) and three major regional/national/international conferences during the funding period.

In addition, the institute will begin offering a series of educational programs at the Big Creek facilities. These outdoor programs for children, adults, senior citizens, the handicapped, and higher education students will focus on the natural environment and foster an understanding and appreciation of Montana's northern Rocky Mountain ecosystem. Educational program activities will be scheduled for a minimum of 100 days per year and could serve well over 1,000 students and educational participants per year.

The senior personnel of The Glacier Institute are well qualified to conduct the programs proposed and have demonstrated their skills during the five years since the inception of the institute. Commitment of support has been obtained from the cooperative agencies and local groups. Comments received from the Environmental Quality Council, 49th Parallel Institute, and

Office of Public Instruction are supportive of the proposal.

FINANCIAL ASSESSMENT:

The recipient and administrator of the grant funds will be Flathead Valley Community College. FVCC will also contribute approximately \$10,000 of in-kind services for the Big Creek project. The remaining funds will be contributed by The Glacier Institute (\$18,500), Flathead National Forest (\$16,000), Glacier National Park (\$4,000), and the Glacier Natural History Association (\$3,000). The Glacier Institute may also receive additional support from individual and foundation contributors. The grant funds can be broken down into four general budget categories over the two year term:

FVCC Administration	\$ 7,200
Glacier Institute Personnel	45,600
Conference Funds	9,600
Educational Programs	<u>9,600</u>
	\$72,000

The amount budgeted for the various items and the requested amount appears reasonable and adequate.

ENVIRONMENTAL ASSESSMENT:

The primary purpose of this proposal is to create an awareness of natural resource management issues and conflicts as they relate to overall environmental management and protection.

RECOMMENDATION:

DNRC recommends a grant in the amount of \$72,000 contingent upon DNRC approval of scope of work and budget.

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APPLICANT NAME: Lewis and Clark County

PROJECT/ACTIVITY NAME: Framework for Groundwater Protection: A Hydrogeologic Evaluation of the Helena Valley

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: \$27,350 - Lewis and Clark County  
\$14,164 - University of Montana  
\$17,819 - Montana Bureau of Mines and Geology  
\$66,200 - United States Geological Survey

TOTAL PROJECT COST: \$225,533

PROJECT DESCRIPTION:

A goal of the Lewis and Clark City-County Board of Health is to exercise long-term groundwater management options that maximize beneficial use and minimize water quality degradation of the Helena valley aquifer. Therefore, Lewis and Clark County is requesting funding for a hydrogeologic study of the Helena valley aquifer. The purpose of the study is to provide a data framework upon which a long-term, comprehensive management program will be built. Water use, waste disposal practices, and past and present industrial activity, combined with the shallow aquifers, coarse soils, discontinuous fine sediment layers and the fact that the aquifer is the sole domestic supply for 13,000 residents, provide incentive for such a program.

In the past, three separate USGS groundwater studies have evaluated the groundwater resources of the Helena valley. The result of these efforts is a general description of the aquifer. The proposed study will expand the existing data base describing the aquifer, improve the present water quality monitoring network, perform two site specific water quality studies, and develop a general predictive computer model of the aquifer system. Implementation includes: surveying and monitoring 40 existing domestic wells for water quality and level; establishing 5 permanent monitoring wells; installing 2 gaging stations on inflowing streams for recharge analysis; and performing 50 short-term pump tests. In addition, two septic systems will be monitored and evaluated to test treatment effectiveness and two agricultural sites will be instrumented to study the impact of agriculture on groundwater resources.

The USGS will implement the project and will assist with project financing. The University of Montana and the Montana Bureau of Mines and Geology will each provide a graduate student to work with the USGS. Faculty members for each school will supervise the students and provide some equipment. The USGS will supervise the overall study effort. The county will administer the grant contract.

TECHNICAL ASSESSMENT:

One of the anticipated study results includes the description of the Helena valley aquifer. Present data describes the aquifer on a broad scale and allows for a general understanding of aquifer characteristics. The new data will provide additional detail to the existing data base and would provide an adequate framework for long-term management. The data also may be helpful in resolving some current site-specific problems. However, it is important to understand that the proposed study is large in scale and may not be adequate to address some of the site-specific issues discussed in the application.

A second anticipated study result is locating and quantifying aquifer recharge and discharge. Given limited stream gaging stations, irrigation inflows estimated from the area irrigation



district, withdrawals based on population data, and the difficulties associated with seepage studies, any analysis of recharge and discharge should be considered a first order approximation. The key new data are the expanded groundwater flow data, and the addition of limited streamflow data (two stations for two years).

The proposed addition of five long-term monitoring wells will help establish the groundwater impact of certain past and present land use activities and, therefore, help establish a base upon which a groundwater monitoring network may be developed. The county has expressed a willingness to operate the proposed monitoring wells beyond the two-year term of the requested grant.

Another anticipated study result is the characterization of the present level, distribution, and sources of groundwater contamination. The general groundwater quality monitoring proposed (40 existing wells) will provide a two-year snapshot of groundwater quality throughout the valley. Again, the scale is very broad and so must be the characterization. There is the potential to locate additional localized water quality problems and the data would allow for the general evaluation of water quality trends.

The evaluation of the consequences of existing and future groundwater withdrawals is also an intended study result. This will be accomplished by using the existing and new data to develop a predictive computer model. The proposed model will be good for evaluation at the regional scale, and as more detailed data becomes available, the model could be refined to resolve more detailed problems.

The proposed study of two septic systems and two agricultural sites will be helpful for evaluating the consequences of waste disposal and land management practices on the quality of groundwater. Whether these two specific studies will be applicable to other selected sites will depend upon the similarity of those sites, control of other factors that influence testing, and local hydrogeology. The agricultural land use evaluation should be coordinated with other agricultural groundwater studies. Basically, the proposed study will provide a better general understanding of the aquifer, and that should result in better management decisions and planning but will not provide detailed answers to some of the existing problems or concerns.

#### FINANCIAL ASSESSMENT:

The USGS will cost share up to \$66,200 through its Federal-State Cooperative Program. The University of Montana and the Montana Bureau of Mines and Geology intends to provide graduate students and in-kind services for an approximate cost share of \$31,983, and the county will contribute \$27,350. These contributions total \$125,533 or 56 percent of the total project cost. This represents a unique cooperative effort of federal, state, and local entities, and from that perspective should be considered cost effective.

Specific aspects of the budget are not well developed, such



as supporting services (lab analysis, etc.) and equipment, and from that perspective are difficult to assess individually. However, overall the project budget seems reasonable and consistent with similar efforts in the past.

Project costs are distributed as follows: contract administrative \$2,000 (DNRC & county); UM faculty \$14,000 (DNRC & UM); MBMG faculty \$10,920 (MBMG); USGS staff and students \$76,800 (USGS & DNRC); indirect costs \$9,121 (UM & MBMG); benefits \$5,482 (DNRC, UM & MBMG); lab services \$20,560 (DNRC & county); travel \$13,095 (DNRC & USGS); gaging stations and seepage \$21,000 (DNRC & USGS); report \$2,500 (all); supplies and communication \$9,000 (USGS); data base organization \$4,800 (DNRC); equipment \$11,000 (county); basin inventory and aquifer testing \$18,600 (DNRC & USGS); drilling \$6,645 (DNRC).

#### ENVIRONMENTAL ASSESSMENT:

Improper installment and use of monitoring wells could result in some groundwater quality degradation and land surface disturbance. For the most part, the study is a data collection and analysis effort and should result in minimal to no environmental impact. An improved understanding of the general character of the aquifer and certain specific issues should result in improved resource management.

#### RECOMMENDATION:

DNRC recommends a grant of up to \$100,000 contingent on DNRC approval of project scope of work and budget. This funding is also contingent on the participation of the USGS, Lewis and Clark County, the Montana Bureau of Mines and Geology, and the University of Montana as outlined in the Water Development Program application.

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APPLICANT NAME: Department of State Lands

PROJECT/ACTIVITY NAME: Pilot Urban Forestry Project

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS:

\$24,000	- DSL/Federal Urban Forestry Grant
\$61,000	- Headwaters RC&D and Communities (in-kind)
\$18,520	- DSL (in-kind)
\$14,000	- Community match for planting stock

TOTAL PROJECT COST: \$217,520

#### PROJECT DESCRIPTION:

The Forestry Division of the Department of State Lands (DSL) is requesting funding to assist communities in the seven county Headwaters RC&D area develop urban forestry programs. As proposed, DSL would hire an urban forester for two years to help communities conduct tree inventories, create official tree boards, draft tree ordinances, and develop plans for tree planting and maintenance. Fifty percent of the state urban forester's salary would come from federal match funds. At least six communities in the Headwaters RC&D area, upon development and implementation of their community urban forestry programs, would receive financial assistance under this grant to plant trees. Communities would be required to provide 25 percent of the tree planting costs, with state funds providing the remaining 75 percent. It is anticipated that approximately 1,000 trees and shrubs would be planted in the communities that complete the planning portion of the project.

DSL would additionally produce an urban and community slide/tape program that would be applicable statewide.

#### TECHNICAL ASSESSMENT:

Most communities in Montana do require technical assistance for the establishment and implementation of a successful community tree program. DSL is presently able to offer limited assistance to communities requesting help in inventorying trees and establishing community tree programs. The Montana Cooperative Extension Service forester and the RC&D forester assigned to Headwaters RC&D may also be able to offer assistance. The communities must also be committed to providing maintenance and care for the trees once they are planted. Proper watering, pruning, and replacement of dead and diseased trees is of utmost importance for a successful tree program.

The application identifies the basic steps to be followed in the development of a tree program at the community level and the required commitments of the community before economic assistance would be provided for tree planting. Specific communities expressing a need or interest in this program are not identified in the application. However, discussions with the applicant indicate that Drummond, Philipsburg, Deer Lodge, Dillon, Anaconda, and Butte would likely receive assistance for the community tree programs.

#### FINANCIAL ASSESSMENT:

Of the \$100,000 requested, \$56,000 is for tree planting; \$24,000 is for salaries and benefits; \$4,000 is for travel; \$10,000 goes to DSL for grant administration; \$5,000 is for contingencies; and \$1,000 goes to Headwaters RC&D for supplies and communications.

Assuming a 25 percent contribution from the communities for tree planting, a total of approximately \$70,000 would be available for the purchase and planting of the trees. With an estimate of 1,000 trees and shrubs, it appears each planting will cost an average of \$70.

DSL has made no commitment to continue funding the state

urban forester position beyond the two-year time frame. Since this is intended to serve as a pilot program, DSL should be required to continue and, if possible, extend this program statewide should it prove successful in the Headwaters RC&D area.

ENVIRONMENTAL ASSESSMENT:

Results of this urban tree planting effort should prove to be environmentally beneficial.

RECOMMENDATION:

DNRC recommends that DSL support the position of a state urban forester through its department budget process. A grant of \$60,000 is recommended contingent upon DNRC approval of scope of work and budget, provided that a maximum of \$56,000 be used for planting of trees in various communities with completed official tree programs and that each community contribute 25 percent of the tree planting costs. The remaining \$4,000 of grant funds is to be used for administration and preparation of the slide/tape program. Grant funds are to be available only to communities with populations of less than 10,000.

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APPLICANT NAME: City of Belgrade

PROJECT/ACTIVITY NAME: Belgrade Meter Installation and Water Main Replacement

AMOUNT REQUESTED: \$51,015 Grant; \$153,046 Loan

OTHER FUNDING SOURCES AND AMOUNTS: None

TOTAL PROJECT COST: \$204,061

PROJECT DESCRIPTION:

The City of Belgrade is located in southwestern Montana along Interstate 90 about 9 miles west of Bozeman. The city is proposing to install water meters on services not presently metered and to replace 2,233 feet of old deteriorated 4-inch water main.

Installation of water meters on 813 services that are not presently metered is the first part of the proposed improvements. There are presently 200 metered services in the city. By metering the water use, the city should be able to reduce the water demand rather than increasing the water supply. During the summer, the fire protection from the storage reservoir is jeopardized by the high irrigation demand and installation of the water meters will help conserve the existing water supply.

The second part of this project would provide for the replacement of 2,233 feet of the existing 4-inch water main with a 6-inch water main. The existing 50 year old main does not have



adequate cover for freeze protection and is a maintenance problem because of the depth of bury and the deteriorating condition of the main. Fire flows are also restricted in this area of the city. Five new fire hydrants would also be installed in conjunction with this line.

#### TECHNICAL ASSESSMENT:

The City of Belgrade has spent several thousand dollars in the last five years to increase its water supply and still has to conserve water during the irrigation season. Instead of further increasing the supply, the city and its engineer propose to install water meters on the remaining 813 services in town. Installation of water meters is considered a conservation measure and has been estimated to conserve up to 50 gallons per capita daily. By doing so, the city should realize a decrease in the water demand thereby conserving the supply. Power and maintenance costs should also be reduced. This approach appears to be reasonable and should conserve water.

The city has indicated that the older lines located in town that have an inadequate depth of bury are first priority for replacement. The proposed lines for replacement fit within this category and appear to be reasonable improvements and should improve the city's distribution system.

The design of the proposed improvements will be reviewed and approved by the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences prior to beginning construction. Conceptually, the WQB agrees with the project proposal, and has ranked it in the middle on a list of its priority projects.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$204,061. Of this total, \$150,628 is allocated for construction and contingencies, \$36,264 for the labor and overhead to install the water meters, and the balance covers engineering, administration, and financing. The applicant requests a \$51,015 grant and a \$153,046 loan from DNRC. The city will provide labor to install the meters, but will not be contributing any direct funds to complete the project.

The cost estimates seem realistic and reasonable, and it appears that the most cost effective alternative to the problem was chosen. Based on a loan of \$200,000 and an interest rate of 7.3 percent the city proposes to raise the water rates by 8.5 percent to provide funds for the meter installation and water line replacement. Current residential water user rates are \$21.42 per month and are expected to increase to \$23.23 per user per month.

#### ENVIRONMENTAL ASSESSMENT:

The only adverse impacts that will result from this project are those minor, short-term effects typically associated with construction projects. All construction will take place within existing right of ways. Positive impacts will be conservation of water and energy, elimination of potential contamination to the



water supply, and increased fire protection.

RECOMMENDATION:

A grant of up to \$50,000 and a loan for \$150,000 is recommended contingent upon the City of Belgrade securing the remaining \$4,061 to complete the project funding. If grant funding is not available for this project, the city may request a loan of up to \$200,000. Any reduction in scope will result in a proportionately smaller grant and should not affect the priority improvements. DNRC must also approve the project scope of work and budget.

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APPLICANT NAME: Department of Fish, Wildlife and Parks

PROJECT/ACTIVITY NAME: Wildlife Habitat  
Establishment/Conservation Program

AMOUNT REQUESTED: \$50,000

OTHER FUNDING SOURCES AND AMOUNTS: \$50,000 - DFWP License  
Money

TOTAL PROJECT COST: \$100,000

PROJECT DESCRIPTION:

The Department of Fish, Wildlife and Parks is proposing to continue its program of encouraging wildlife habitat improvement plantings on land enrolled in the USDA Conservation Reserve Program. The Conservation Reserve Program of the 1985 Farm Bill (Food Security Act) is designed to take highly-erodible croplands out of production by establishing permanent vegetative cover. The federal government cost-shares at a rate of 50 percent for this permanent vegetation establishment. The purpose of DFWP's program is to provide additional incentive for the planting of shrubs and trees more suitable for wildlife habitat on CRP acreage through an additional 50 percent cost-share program. The wildlife habitat funds are available on a first come, first serve basis and are limited to \$1,000 per landowner.

Upland game birds and waterfowl are the primary beneficiaries of the program; however, deer, antelope, and nongame species also benefit.

TECHNICAL ASSESSMENT:

The DFWP wildlife biologist in each region, along with Soil Conservation Service personnel, works with the landowner to determine which species are most appropriate and suitable. Cost-share assistance is allowed for tree and shrub shelter belts of two rows or more and when two or more species are planted. Any herbaceous vegetation seeding mixture cannot exceed 25 percent

crested wheatgrass to be eligible.

According to officials from the SCS and ASCS, the wildlife habitat program has been well-received by participating landowners, with the entire present level funding of \$50,000 per year expended for 1988 and at least \$20,000 already committed for 1989.

The DFWP will monitor the success of the establishment of wildlife habitat plantings for the first two years of the program. The evaluation has not yet been conducted, and due to severe drought conditions, it is suspected that a fair amount of the acreage may have to be replanted.

The requested grant funds are planned to be used for cost-share assistance upon availability of funds or upon sign-up for CRP for the 1990 crop year, whichever comes first.

#### FINANCIAL ASSESSMENT:

The wildlife habitat program is presently funded totally with revenues generated through hunting license fees. The DFWP would continue to provide \$50,000 in license funds should this grant request be approved.

No administrative costs would be charged under this program. The DFWP will continue to pay the state-owned or private nurseries directly for plant materials selected by the SCS, DFWP, and landowner. The SCS provides certification of completion of planting to the DFWP.

#### ENVIRONMENTAL ASSESSMENT:

The successful establishment of a variety of permanent vegetation on CRP acreage versus a monoculture of grasses, such as crested wheatgrass, will result in better wildlife habitat and afford better wind erosion protection and improved soil structure and fertility.

#### RECOMMENDATION:

A grant of up to \$50,000 is recommended contingent upon DNRC approval of scope of work and budget.

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APPLICANT NAME: Town of Hysham

PROJECT/ACTIVITY NAME: Hysham Water System Improvement Project

AMOUNT REQUESTED: \$50,000 Grant  
\$150,000 Loan

OTHER FUNDING SOURCES AND AMOUNTS: \$375,000 - CDBG Grant  
\$156,500 - FmHA Low Interest  
Loan, or Grant

TOTAL PROJECT COST: \$731,500

#### PROJECT DESCRIPTION:

The Town of Hysham, located between the Yellowstone River and Interstate 94 about 75 miles east of Billings, has a population of 420 people. The town's water system was originally constructed in 1927 and upgraded in 1977 and 1980. The system consists of an infiltration collection gallery which conveys water to an 84-inch diameter vertical caisson; a 100,000 gallon concrete clearwell storage tank; and gas chlorination facilities with two 50 horsepower, 600 gallon per minute vertical turbines pumping the treated water to a 100,000 gallon water tower. Water is distributed through 4-inch cast iron water mains.

Seventy percent of the town's residents are listed as low to moderate income and 64 percent are over 50 years of age, with limited re-payment capabilities. The town's infiltration gallery is ineffective in filtering out microbial contaminants and on June 9, 1986 the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences issued a "Health Advisory" for the water supply.

The town proposes to increase the water supply to meet present and future demands, improve the water quality, and eliminate the water contamination problems. Contamination would be eliminated by renovating and upgrading the existing water supply infiltration gallery, constructing an additional infiltration gallery and collection lines, installing continuous turbidity monitoring and recording equipment, constructing an additional 120,000 gallon clearwell storage for increased chlorine contact time, and constructing a slow sand filter for water treatment, along with other minor improvements. The project will add more storage capacity to the water system to allow for adequate water treatment, increase fire protection capacity, and bring the system into compliance with state and federal drinking water standards.

#### TECHNICAL ASSESSMENT:

The Town of Hysham had a preliminary engineering report conducted in March 1987 to determine what alternatives were available to bring the water system into compliance with the health advisory and to assure an adequate water supply for the town. The study was comprehensive and adequately addressed all areas of the water system. The need for improvements to Hysham's water supply is documented by the health advisory and the proposed project is appropriate, technically feasible, and should produce the desired results.

The design of the proposed improvements will be reviewed and approved by the WQB prior to beginning construction. Conceptually, the WQB agrees with the project proposal, and has ranked it number one on its list of priority projects.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$731,500 of which \$669,500 is for construction and contingencies, \$79,000 is for professional/technical costs, with the balance for administration and financing. The applicant has requested a

\$50,000 grant and \$150,000 loan from DNRC. The town has requested and received authorization for a \$375,000 Community Development Block Grant and will complete the funding with a \$156,500 low interest loan or grant from FmHA.

The cost estimates appear realistic and reasonable and the most cost-effective alternative presented was selected. The town is in the process of raising the monthly water user rate for the 208 users from an average of \$9.31/month to \$13.08/month. An additional increase of \$3.20/month/user to \$16.28/month/user will be required for the town to retire the DNRC loan debt.

#### ENVIRONMENTAL ASSESSMENT:

Construction of the infiltration gallery and collection lines will result in a short-term increase in the turbidity levels of the Yellowstone River and will require a stream access work permit from the Department of Fish, Wildlife and Parks. A construction permit allowing short-term exceedence of turbidity standards may be required by the WQB. Other adverse impacts that will result from the project will be those minor, short-term effects typically associated with construction projects.

Anticipated long-term effects of a better quality and quantity of drinking water for the Town of Hysham will be a positive impact. The WQB health advisory will also be dropped as a result of the project.

#### RECOMMENDATION:

A grant of up to \$50,000 and a loan for \$150,000 is recommended contingent upon the Town of Hysham securing the remaining funding to complete the project. If grant funding is not available for this project, the city may request a loan for up to \$200,000. Any reduction in scope will result in a proportionately smaller grant and should not affect the priority improvements. DNRC must also approve the project scope of work and budget.

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APPLICANT NAME: Whitefish County Water and Sewer District

PROJECT/ACTIVITY NAME: Swift Creek Clay Banks Pilot Project

AMOUNT REQUESTED: \$73,440

OTHER FUNDING SOURCES AND AMOUNTS: \$4,055

TOTAL PROJECT COST: \$77,495

#### PROJECT DESCRIPTION:

Excessive erosion of clay banks along Swift Creek contributes large amounts of fine sediment to Whitefish Lake. In addition to turbid water and accelerated sedimentation rates, phosphorous associated with the sediments contributes to the lake's nutrient



load, which is alarmingly high. Elevated levels of phosphorous stimulate algae growth, reduce dissolved oxygen levels needed for fish, and accelerate the process of eutrophication. Whitefish Lake is a valuable recreational resource and an important part of the local economy.

This proposal would apply a variety of remedial erosion control measures on three demonstration sites to test their effectiveness in stabilizing eroding banks. It is intended as a pilot project for a larger scale, future effort to stabilize as many as 40 sites along the lower 10 miles of Swift Creek. This project would not directly result in significant overall reduction of sediment and phosphorous loading to Whitefish Lake. However, if successful erosion control methods can be developed, future widespread application could reduce the lake's sediment load by 65 percent and phosphorous load by 25 percent (applicant's estimate).

#### TECHNICAL ASSESSMENT:

Several studies have identified nutrient loading as a significant water quality problem in Whitefish Lake. A 1977 study by the U.S. Environmental Protection Agency concluded that the lake is oligotrophic (pristine) and is nitrogen-limited in June and phosphorous-limited in July and September; Swift Creek was credited with contributing 70.6 percent of the total phosphorous load of the lake. A detailed limnological study by Golnar and Stanford (1984) found that Swift Creek supplied 53 percent of the lake's total annual phosphorous load and classified the lake as oligomesotrophic (somewhat less than pristine). They predicted that serious eutrophication problems would result if phosphorous inputs increase in the future.

Soluble phosphorous is more biochemically available for plant growth than non-soluble forms and is of greatest importance in evaluating the trophic status of lakes. Jourdannais and others (1986) examined phosphorous dynamics in Whitefish Lake and found that about 38 percent (1768Kg) of the total phosphorous loading (4658Kg) to Whitefish Lake is in soluble form. About 32 percent (564Kg) of the soluble phosphorous in the lake is contributed by Swift Creek (a grab sample from Swift Creek showed that about 36 percent of soluble phosphorous was soluble reactive phosphorous).

The amount of biologically available phosphorous associated with Swift Creek sediments entering the lake is unclear. The difference between Swift Creek's total annual phosphorous input (2490Kg) and soluble phosphorous input (564Kg) gives an estimate of sediment or particulate phosphorous (1926Kg). Generally, on an average annual basis, ten percent or less of sediment phosphorous is biologically available in the Flathead basin. Reduction of sediment inputs from Swift Creek would affect only this fraction of biologically available phosphorous and would not significantly reduce soluble phosphorous inputs. Based on available information, a 100 percent reduction in sediment yield from Swift Creek clay banks could result in a ten percent reduction in the biologically available phosphorous of Whitefish Lake.

The applicant proposes to test a variety of erosion control methods on three sites (eroding clay banks) to determine which measures are most effective. A fourth site with no erosion treatment will be used as a control. With the exception of using tire-blankets as bank armor, the proposed erosion control methods are standard and include backsloping and terracing of banks, revegetation, bank armor, and flow deflectors. Site-specific designs are not given in the application. Monitoring of erosion processes and vegetation growth at study sites is planned but the monitoring plan is not well defined. Results of this project are planned for use in developing a comprehensive project to stabilize as many as 40 eroding banks in the lower 8 mile segment of Swift Creek.

Reviewers were generally supportive of the project but expressed a number of concerns. The suitability of using old tires as bank protection was questioned. Several reviewers indicated that forest practices in the Swift Creek drainage may have increased water yields (peak flows), thereby contributing to bank erosion problems, as well as phosphorous loading. This proposal does not address the extent to which forest practices effect channel erosion processes or phosphorous loading.

The proposed project evaluation period of one year (post-construction) is inadequate. Physical performance of stream channel modifications must be monitored over an extended period of time (five years or greater) to obtain an adequate sample for evaluation purposes. To a large extent the duration of monitoring is dependent on the post-implementation climate and flow-regime experienced by the project. The monitoring period must include peak flows of sufficient magnitude to adequately test the design.

This project by itself would not result in a significant reduction of phosphorous loading in Whitefish Lake. The successful application of erosion control methods developed by this project, to other eroding clay banks, could result in at most a 10 percent reduction in inputs of biologically available phosphorous. However, this reduction is considered very significant given the borderline trophic status of Whitefish Lake.

#### FINANCIAL ASSESSMENT:

This project appears feasible with the requested funds. Additional commitment of funds is probably necessary to ensure adequate project monitoring and evaluation.

The total project cost is \$77,495, of which \$4,055 would be provided by the applicant. In addition \$11,500 is being sought from U.S. EPA Solid Waste Division to test the use of tire-blanket revetment. (The expanded long-range project envisioned for the entire lower 8 miles of Swift Creek is presently a candidate for Section 319, EPA non-point source funds.) Availability of EPA funds is uncertain at this time.

The budget breakdown includes: personnel services, \$32,678 (administrator, engineer, inspector, technicians, labor, and fringe benefits); contracted services, \$2,640 (lab costs, printing); supplies and materials, \$13,072; communication, \$600;

travel, \$745; rent and utilities, \$2,400; equipment \$16,425; and miscellaneous (10 percent construction contingency), \$4,450.

ENVIRONMENTAL ASSESSMENT:

Water quality may be temporarily degraded during the construction phase (elevated suspended solids and turbidity). Activities involving streambed disruption will be confined to non-spawning months of July and August. Revegetation and stabilization of eroding banks over the long-term will result in improved water quality.

RECOMMENDATION:

A grant of up to \$73,440 is recommended for this project contingent upon the following conditions being met:

1. The applicant develops and DNRC approves a rigorous long-term monitoring plan to evaluate performance of erosion control measures.
2. The applicant develops a detailed scope of work and budget, subject to DNRC approval.

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APPLICANT NAME: City of Miles City

PROJECT/ACTIVITY NAME: Water Distribution System Master Plan for Miles City

AMOUNT REQUESTED: \$15,000 Grant

OTHER FUNDING SOURCES AND AMOUNTS: City of Miles City  
(in-kind)

TOTAL PROJECT COST: \$18,000

PROJECT DESCRIPTION:

Miles City has an estimated population of 10,082 residents and is located at the confluence of the Yellowstone and Tongue Rivers in southeastern Montana. Most of the existing water system is between 60 and 70 years old. Most of this older pipe is cast iron and is undersized, corroded, filled with mineral deposits, and in need of replacement.

The purpose of this project is to create a master plan for improving the water distribution system for Miles City on a long term basis. This will be accomplished by developing a hydraulic computer model of the existing system. Distribution system improvements will be evaluated based on projected domestic and fire flow needs. This project will also help to assure that upgrading of old lines will occur in the future in the most cost-effective manner.



#### TECHNICAL ASSESSMENT:

The Master Water Plan will provide information necessary for the city to evaluate any deficiencies in the present water system and the alternatives available for making improvements. Improvements and the associated costs will be ranked so that an orderly development of the system can occur. Due to the age, size, and condition of much of the city's water distribution system, many problems exist. Problems include inadequate system pressures and flows, frequent main line breaks, inadequate fire flows, cross-connection to non-potable water at leaks and when breaks are repaired, and insufficient capability to flush some lines to maintain water quality. This study is needed to optimize the existing and future city funds for main line replacement and establish a priority for line replacements. This project is a logical approach to prioritize the replacement of a deteriorating water distribution system.

The Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences agrees that Master Water Plans are a logical and useful tool that can assist cities in cost-effectively managing water system upgrades. The WQB feels that the project proposed would benefit Miles City and has ranked the project in the middle of its list of priority projects.

#### FINANCIAL ASSESSMENT:

The city requests a \$15,000 grant to hire a professional engineer to complete the Master Water Plan. City personnel will supply \$3,000 of in-kind services to assist the engineer in completing the plan. No additional costs have been included.

#### ENVIRONMENTAL ASSESSMENT:

Because this project is only a study, it will have no environmental effects. Construction impacts due to study recommendations will be minor and confined to existing municipal right-of-way. Positive effects from this project would include an increased water quantity due to the elimination of badly deteriorated and leaking pipes.

#### RECOMMENDATION:

A grant of up to \$16,500 is recommended contingent upon Miles City using the grant money to complete a totally comprehensive Master Water Plan that addresses the water source, transmission, and water treatment as well as the water distribution system. The city has estimated that a comprehensive Master Water Plan of this nature will cost an additional \$18,000 for a total cost of \$33,000, which does not include in-kind services. DNRC has agreed to provide funding for half of this cost. If the city provides engineering verification that the treatment plant does not, at this time, need to be included in the Master Water Plan, then DNRC will authorize a grant for up to \$7,500 or half of the \$15,000 request. DNRC approval of the project scope of work and budget will be required. The final grant amount disbursed will be dependent upon the engineer's cost estimate for the comprehensive Master Water Plan and upon Miles City securing the



additional funding. Miles City must go through a request-for-proposal process to select the project engineer.

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APPLICANT NAME: East Glacier Water and Sewer District

PROJECT/ACTIVITY NAME: Midvale Creek Diversion

AMOUNT REQUESTED: \$91,761.50 Grant

OTHER FUNDING SOURCES AND AMOUNTS: \$780 - East Glacier Water and Sewer District

TOTAL PROJECT COST: \$92,541.50

PROJECT DESCRIPTION:

The East Glacier Water and Sewer District provides an adequate supply of quality water and fire protection for the community of East Glacier Park and Glacier Park Incorporated (GPI). The year-round population of the community is estimated at 400 residents with more than 1,000,000 tourists passing through and staying in town each year. The district's water source is provided by a dam on Midvale Creek which was inadvertently constructed on the Blackfeet Indian Reservation. The water is piped from the reservoir to the district where it is chlorinated and then distributed to the water users.

With no treatment other than chlorination, this surface water source is in violation of Water Quality Standards because of high turbidity levels and potential giardia contamination. The dam also collects large deposits of sediment each year and is cleaned each autumn when the water flows are low. The cleaning process creates turbidity problems downstream violating the Blackfeet Water Quality Management Plan.

East Glacier Park is in need of adequate water treatment facilities. Proper reservoir cleaning facilities and techniques are an essential part of the total water treatment system. The district has applied for a Community Development Block Grant (CDBG) for the water treatment facilities which would consist of the negotiated use and expansion of the existing Glacier Park Inc. clarification and filtration system constructed in 1987.

The purpose of the proposed project is to construct a stream diversion structure in the stream bed connected to a canal to divert the stream flow around the reservoir. Work would be done during the annual cleaning and thus prevent increased sediment downstream. This project coupled with the water treatment facility request to CDBG will give the community a total and complete water system that satisfies Water Quality Standards.

#### TECHNICAL ASSESSMENT:

Stream sediments and gravels accumulate behind the existing dam which is presently cleaned by opening the Midvale Dam flood gates to allow water to drain. A D-8 cat is then used to move the excess gravel and sediment from behind the dam. Sediment is stockpiled along the dam site banks away from the stream bed, and then disposed of at a later date. The grant application addresses three alternatives for solving the sediment problem associated with the cleaning process of the Midvale Dam.

The alternative selected will allow the stream to be diverted around the dam in a canal while the sediment and gravels are cleaned from behind the dam. This alternative appears to be the most logical and cost-effective alternative proposed. It will utilize the existing facilities, secure the water supply of East Glacier and Glacier Park Inc., and satisfy the Blackfeet Water Quality Management Plan.

The design of the proposed improvements will be reviewed by the Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences prior to beginning construction. Conceptually, the WQB agrees with the project proposal and has ranked it toward the top of its project priority list.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$92,541.50 with \$71,069.50 for construction and contingencies and the balance for engineering, administration, and inflation contingency. The applicant has requested a \$91,761.50 grant from DNRC. The district will supply \$780 of in-kind services.

The cost estimates appear realistic and reasonable, and it appears that this is the most cost-effective alternative available. However, the WQB suggested that it may be less costly to install concrete or PVC pipe instead of building a concrete canal.

#### ENVIRONMENTAL ASSESSMENT:

Sediment loads and construction-related impacts will have some short-term adverse effects on Midvale Creek. However, construction of this stream diversion structure will minimize the stream disturbances associated with the cleaning process and should satisfy the Blackfeet Water Quality Management Plan.

#### RECOMMENDATION:

A grant of 25 percent of the total project costs, which include the costs of the negotiated use of the Glacier Park, Inc. clarification and filtration water treatment plant, up to \$50,000 is recommended contingent upon the district securing the remainder of the funds to tie into the existing Glacier Park, Inc. water treatment plant. The Midvale Creek diversion and the water treatment plant are to be considered as one project. The remaining costs for the Midvale Creek diversion may be requested as a general obligation loan. If the grant is received, the existing CSTB loan authority will be dropped. Any reduction in scope will result in a proportionately smaller grant and should not affect the priority improvements. DNRC must also approve the

project scope of work and budget.

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APPLICANT NAME: Yellowstone County

PROJECT/ACTIVITY NAME: Valley Creek/Calamity Jane Reservoir

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: \$400,000 - Potential Federal Funds

TOTAL PROJECT COST: \$500,000

PROJECT DESCRIPTION:

Present flatwater recreation sites within the Billings area include Cooney Reservoir (about 50 miles southwest of Billings), Deadman's Basin Reservoir (about 70 miles northwest), and Bighorn Lake (about 90 miles south). Billings area leaders consider these locations to be either too small or inaccessible to the Billings area population; and therefore are pursuing flatwater recreation within 30 miles of Billings. The 50th Montana Legislature has supported this effort by adopting House Joint Resolution 59 which directs the Department of Natural Resources and Conservation (DNRC), in conjunction with an appropriate local entity, to pursue development of a technically and economically feasible flatwater recreation site within 30 miles of Billings.

DNRC has asked the Bureau of Reclamation (BOR) to evaluate potential recreation sites within the scope of HJR 59. In response to this request, the BOR, through its Technical Assistance Program, has updated existing preliminary studies of the Valley Creek and Calamity Jane reservoir sites. This update primarily consisted of adjusting the facilities to reflect the recreation emphasis and to update costs and benefits to 1987 dollars. The results of this evaluation indicate that the projects would not be economically feasible under federal principles and guidelines, but would be economically justifiable using Montana Department of Fish, Wildlife and Parks economic values. The BOR is presently re-evaluating the economics of the projects using a travel cost model that would satisfy federal standards. The results of this analysis will not be available prior to project ranking.

The project sponsor is requesting a \$100,000 grant to be used as cost-share toward a \$500,000 reservoir feasibility study of a yet to be selected site. The source of non-DNRC funds has not been secured, but federal funds are anticipated. The project sponsor is working with U.S. Representative Ron Marlenee and the BOR in this regard. Indications are that the project sites have been narrowed down to the Valley Creek and Calamity Jane



reservoir sites. Development of these sites is estimated to cost between \$50 and \$60 million dollars.

The specific objectives of this proposal are:

- 1) Based on preliminary evaluations with the Bureau of Reclamation and Department of Natural Resources and Conservation, select a site to be evaluated for feasibility and cost effectiveness
- 2) Examine the site using travel cost model analysis to determine if project benefits would exceed project costs
- 3) Conduct a feasibility analysis under the supervision of the U.S. Bureau of Reclamation

#### TECHNICAL ASSESSMENT:

The investigation phase of water resource projects is an expensive and time consuming process. It should be planned and executed so that the probable soundness of the project will be determined as early and as inexpensively as possible. To accomplish this objective, most projects are divided into several phases with each phase being progressively more detailed as ecological concerns, project funding, water rights, water availability, public support, land acquisition, and economics are satisfactorily addressed.

An expensive, detailed feasibility study should not be pursued until sufficient preliminary analysis has resolved critical project issues. Once the decision is made to proceed with the more detailed feasibility study, a special effort must be made to organize the study so that high risk issues are resolved early in the analysis. A well-developed, thoughtful investigation plan is critical to a well-managed, efficient development project.

Although significant preliminary analysis has been performed and several critical issues have been addressed, there remain a few unresolved issues that should be addressed prior to authorizing funding for the proposed feasibility study. In addition, the scope of the proposed feasibility study is not developed and its adequacy can not be evaluated. Funding of this project should be contingent on the resolution of certain critical issues and approval of the scope of work of the proposed feasibility study. Some of the issues are:

1. Reservoir Site Selection: It appears that two reservoir sites are still being considered and that BOR and DNRC have exhausted their resources to perform preliminary analysis. It is not clear how the project sponsor intends to make a final selection, what criteria will be used, what additional analysis is required, and who is anticipated to perform that analysis.
2. Project Feasibility Study and Construction Funding: Federal funding is anticipated for both feasibility and construction,



but is in jeopardy due to project economics. No other funding source is mentioned. The ability to service a federal debt for construction of this facility would require a significant annual appropriation by the state legislature and/or very high user fees. Clearly, financing this project is a considerable challenge.

3. Reservoir Operation and Maintenance: At present, there is no plan for reservoir operation and maintenance and no budget. A preliminary analysis should establish reasonable O & M capability.
4. 1988 Draft State Comprehensive Outdoor Recreation Plan (SCORP): The policy of the Department of Fish, Wildlife and Parks as communicated through the 1988 SCORP is that no additional park development be pursued until existing facilities are upgraded to acceptable standards. They do not have the budget to pursue new development.
5. Development Goals and Objectives: The goals and objectives of the development project are not well developed beyond flat water recreation. Mention is made of the swimming and boating demand in the 1978 SCORP, but the results are somewhat misinterpreted. Also, multi-purpose benefits are claimed, but the preliminary cost analysis is based on single purpose recreation facilities that will not support multi-purpose demands. Well-developed goals and objectives are important because they establish the direction of the feasibility study effort and ultimately determine the type of facilities developed and final project cost.
6. Other Issues: It is not clear whether issues such as land rights and acquisition, public support, water rights, and fishery potential have been adequately screened through existing preliminary analyses.

#### FINANCIAL ASSESSMENT:

It is difficult to assess the adequacy of the proposed budget because the feasibility study scope of work is not defined. The project sponsor anticipates that 80 percent of project costs will be federally funded, but these funds are not yet secured. Completion of this project through construction will likely require a significant amount of money up front and substantial cost share. Annual legislative appropriations or some user fee arrangement will be needed to service the debt.

#### ENVIRONMENTAL ASSESSMENT:

This study effort will not adversely impact the environment.

#### RECOMMENDATION:

DNRC recommends that additional reconnaissance level analysis be performed to address certain unresolved issues prior to proceeding with a more expensive detailed feasibility study. The specific issues to be resolved are below.

1. Reservoir Site Selection: The county needs to make a final determination as to which site is to be evaluated and document that determination.
2. Construction Debt Service: While indications are that the project could possibly receive federal financial assistance using economic values developed by the Department of Fish, Wildlife and Parks, there is not an explanation of how the resulting federal and state debt would be serviced. Finance alternatives need to be identified, described, and assessed. At a minimum this would include determining the annual debt service requirement under each financing alternative, determining the revenue generated from the various uses and appropriations, and evaluating financial feasibility based on the information generated. Potential revenue sources include recreation use fees, legislative appropriations, irrigation revenue, and municipal and industrial use fees.
3. Operation and Maintenance Budget: Existing reconnaissance level evaluations have calculated significant annual O&M budget requirements, but do not discuss a source of revenue to meet this requirement. Given the inability of the current DFWP recreation budget to meet existing needs and tight county budgets, generating adequate O&M revenues will likely provide a considerable challenge. The potential sources of annual O&M revenue should be identified, described, and assessed.
4. Multi-purpose Beneficial Uses: Existing reconnaissance level efforts do not adequately address multi-purpose potential specific to the proposed project. All potential beneficial uses associated with reservoir development should be identified, the need documented, the feasibility evaluated, and the cost determined. Consideration must be given to competing uses and associated impacts.
5. Water Availability and Water Rights: The quantity of water required to meet recreation water quality needs and multi-purpose uses must be established and compared to the water available after existing water rights and reservations have been satisfied. The feasibility of obtaining water rights for the intended uses must also be assessed.

A grant of up to \$10,000 is recommended for the purpose of addressing the four issues listed above, contingent on DNRC approval of the study scope of work and budget. Other issues not fully resolved (land acquisition, water rights, etc.) would most appropriately be addressed in a phased feasibility study. DNRC

also advises that the Department of Fish, Wildlife and Parks be designated the coordinating state agency overseeing state involvement in the overall development of the proposed flat water recreation site.

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APPLICANT NAME: City of Glasgow

PROJECT/ACTIVITY NAME: Water and Wastewater System Comprehensive Master Plan

AMOUNT REQUESTED: \$100,000 Grant

OTHER FUNDING SOURCES AND AMOUNTS: \$19,050 - City of Glasgow

TOTAL PROJECT COST: \$119,050

PROJECT DESCRIPTION:

The City of Glasgow, with a population of about 4,450 people, is located in northeastern Montana along the Milk River and Highway 2 just 18 miles northwest of Fort Peck Dam. Most of the city's water system was installed between 1900 and 1940 with some improvements occurring in the 1960s. The majority of the original wastewater system was installed between 1920 and 1940 with some additions made in the 1960s. The aging infrastructure has been causing the city numerous problems for many years.

The City of Glasgow's proposed project is to develop a Water and Wastewater System Comprehensive Master Plan to evaluate the existing municipal water distribution and storage facilities as well as the municipal wastewater collection and treatment system, and to develop a document to be used for planning and preparation of a capital improvements program. The evaluation of the municipal water distribution and storage facilities will be accomplished by field flow testing of water main capacities and evaluation of fire flow and storage capacities using computer models and flow simulation of the entire water distribution system. The wastewater collection system will be evaluated by televising selected sewer mains to provide data on pipe condition, deficient grade lines, and service connection locations. Inadequate hydraulic or biological capacity of the treatment ponds will also be identified.

TECHNICAL ASSESSMENT:

The final result of the Water and Wastewater System Comprehensive Master Plan will be a useful comprehensive master plan that will be used by the city planners, engineers, and administration to create an efficient and effective capital improvement plan. The document will provide information and some system of priority for making improvements in the water and



wastewater facilities to assure the best use of available funds.

The Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences agrees with the concept of the project and that a master plan can be very useful, if complete. The project should evaluate and review existing wastewater system planning work previously completed and the city maintenance records and project records that may be available for additional information. The WQB feels that a master plan for the wastewater system that is derived solely from television work as presented, would not be complete. The proposed water system analysis appears to be satisfactory and should achieve the desired information.

#### FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$119,050, with \$19,050 for administration, \$22,925 for engineering, \$67,075 for the televising of the sewer mains, and the remaining \$10,000 for contingencies. The applicant has requested a \$100,000 grant from DNRC. The city will supply \$19,050 for in-kind services which include one-third of the Director of Public Works' time and one-half of the city/county planner's time devoted to the project during the period.

#### ENVIRONMENTAL ASSESSMENT:

No negative environmental impacts will be associated with this master plan. Long-term planning efforts using the document generated from this project may lead to water main replacements to reduce water losses, sewer main replacement to protect sanitary conditions, and ultimately, to higher quality discharges of treated effluents to the Milk River.

#### RECOMMENDATION:

A grant of up to \$25,000 is recommended contingent upon DNRC approval of the project scope of work and budget. DNRC grant funds will be used as a 50 percent match to complete the water system analysis, the sewer system evaluation, and the master plan. The sewer system should be inventoried based on age of the lines, size of the lines, type of material the lines are made of, and any past problems recorded with any sections of line. Based on this inventory, the sewer system will be prioritized as to the need to televise the potential problem sections. Any of the remaining \$25,000 of grant funds may be used to televise these top priority lines. The project sponsor must secure the additional funds needed to conduct the additional television work necessary to complete the project. Glasgow must go through a request-for-proposal process to select an engineer for this project.



APPLICANT NAME: Department of State Lands

PROJECT/ACTIVITY NAME: Integrated Forest Resource Information  
System for State Forest Lands

AMOUNT REQUESTED: \$99,995

OTHER FUNDING SOURCES AND AMOUNTS: \$35,398 - DSL  
\$64,229 - University of  
Montana

TOTAL PROJECT COST: \$199,622

PROJECT DESCRIPTION:

The Forestry Division of the Department of State Lands (DSL) requests funds to develop an Integrated Resource Information System (IRIS) to be used for planning management activities on the state's school trust lands. The IRIS is a computerized forest land planning and management system that integrates timber stand data, timber growth models, economics data, road plans and cost data, harvesting scheduling models, environmental constraints, and computer mapping capabilities.

The IRIS will be jointly developed by the Forestry Division of DSL and the School of Forestry at the University of Montana (UM). University involvement will consist of two professors, a computer programmer, and students, while DSL will provide the services of four of its employees.

The proposed IRIS will allow the integration of forest resource data and timber value and cost data with computer decision software and a computer mapping system. It will permit foresters to make better use of available resource data and management information when planning on-the-ground management activities. The IRIS will be developed to run on microcomputers.

The Swan State Forest has been selected as the prototype study area for developing the proposed IRIS because timber stand information has already been collected and entered into a computer database, road building plans have been developed, and because the Swan is a fairly large parcel of state land that supports several competing uses.

TECHNICAL ASSESSMENT:

The proposed IRIS will be developed within the framework of a geographic information system (GIS), which is simply computer software that handles data on vegetation, land, and other characteristics that describe a piece of ground. This system can produce computer-generated maps that show various ground characteristics. The data can be mapped and viewed almost instantly as changes are proposed. For example, if a forester

has several ideas for configuring timber cutting units and several possible road patterns, the GIS could quickly produce maps of the various alternatives.

The proposal is innovative and capable of producing long-term results and benefits for state forest land management. The approach is typical of that currently being used by leading natural resource agencies and businesses in this country and Canada.

The cooperative approach between DSL and UM for development of the IRIS represents a realistic, economical means to significantly address improved forest resource planning in the state.

#### FINANCIAL ASSESSMENT:

The proposed project will be funded from three sources: 1) RRD grant funds, 2) DSL in-kind services, and 3) a McIntire-Stennis grant through UM.

The DSL funding will be in-kind services of four members of the Forestry Division staff. All of the computer hardware needed for the project is already planned for purchase by the Forestry Division and not included with the grant request. The UM's, School of Forestry will fund a portion of the project with a McIntire-Stennis grant which, combined with the RRD grant, will pay the Forestry School professors, graduate students, and a mathematical consultant.

RRD grant funds are to be used as follows: \$32,000 for a computer programmer; \$19,612 for a graduate assistant, \$7,509 for fringe benefits, \$15,000 for computer software, \$15,000 for map digitizing, and \$10,844 for UM indirect costs.

#### ENVIRONMENTAL ASSESSMENT:

The intended purpose of the IRIS is to allow foresters to make better resource management decisions. The development of the IRIS will have no environmental impact.

#### RECOMMENDATION:

DNRC recommends a grant of up to \$89,121 (\$99,995 less \$10,874 indirect costs) contingent upon DNRC approval of scope of work and budget.

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APPLICANT NAME: City of Columbia Falls

PROJECT/ACTIVITY NAME: Master Water Plan - Phase II

AMOUNT REQUESTED: \$91,500 Grant

OTHER FUNDING SOURCES AND AMOUNTS: \$29,000 - City of Columbia Falls

TOTAL PROJECT COST:    \$120,500

PROJECT DESCRIPTION:

The City of Columbia Falls is located in northwestern Montana between Kalispell and Glacier Park and has an estimated population of 3,112 people. The city is supplied with water from two sources, (1) an SCS built dam on Cedar Creek, and (2) a 231-foot well on the west border of the city. These supplies are chlorinated and then distributed to the water users. No other forms of treatment or filtration presently exist.

In 1985, the city contracted with an engineering firm to conduct Phase I of a Master Water Plan which examined the sources of supply, the basis of water storage, and the appropriate type of water treatment or filtration. The purpose of Phase II of this project is to analyze the distribution system, drill and develop two test wells, and to complete the preliminary plans and specification for the water system complete with source development, treatment, and storage facilities that will most economically meet all present and future needs of the City of Columbia Falls. The system improvements must also meet all of the requirements of the Safe Drinking Water Act.

TECHNICAL ASSESSMENT:

The City of Columbia Falls hired an engineering firm to examine the sources of supply, the basis of water storage, and the appropriate types of water treatment or filtration for Phase I of a Water Master Plan. Phase II of the Master Water Plan will include an analysis of the distribution system, development of test wells to determine if groundwater can supplement the supply, evaluation of the best alternatives for upgrading the city's water system, and preparation of the preliminary plans and specifications. Phase III will develop the actual design and construction of the project as developed in the plans and specifications, but is not a part of this project.

The city is requesting funds for only Phase II of the Master Water Plan. The Master Water Plan will help to determine the most cost effective and technically feasible alternative for upgrading the city's water system. An engineering firm will be selected to conduct the Phase II work. This is a logical and reasonable approach to follow for preparing preliminary plans and specifications for a water system improvement. The Water Quality Bureau (WQB) of the Department of Health and Environmental Sciences agrees that there is a need for the project because the present system is using untreated surface water, and the City of Columbia Falls must ensure that the future water needs are met. The WQB has ranked this project in the middle portion of its project priority list. The WQB will review and approve the preliminary plans and specifications that are proposed to be the final product of Phase II.

FINANCIAL ASSESSMENT:

The total cost of the project is estimated to be \$120,500. Of this total, \$19,000 has already been spent to complete Phase I



of the Master Water Plan; with \$10,000 of in-kind services from the city. Engineering will cost \$58,500, and \$33,000 is needed to develop two test wells and to cover contingencies. The applicant requests a \$91,500 grant from DNRC.

The cost estimates appear realistic and reasonable, and the city will receive the preliminary plans and specifications for the future improvements to the water system.

ENVIRONMENTAL ASSESSMENT:

There will be no effects from conducting Phase II of the Master Water Plan on the soils, vegetation, wildlife, or other natural resources except for the minor impact associated with testing the two wells.

The positive environmental effects of building a new system include improved water quality, provision of sufficient water quantity, and elimination of the potential for giardia contamination.

RECOMMENDATION:

A grant of up to \$20,000 is recommended contingent upon the completion of the Master Water Plan containing the analysis of source development, treatment, storage facilities, and the distribution system. The Master Water Plan will analyze the deficiencies of the water system and prioritize the improvements necessary to meet the present and future water demands of Columbia Falls. The DNRC feels that the development of the test wells is not within the scope of a Master Water Plan and the need to develop another water source will be determined in the final analysis of the Master Water Plan. The DNRC also feels that preparation of the plans and specifications should be done during Phase III of the project. DNRC approval of the project scope of work and budget will also be required. The city must also secure any additional funds necessary to complete the Master Water Plan.

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APPLICANT NAME: Missoula County

PROJECT/ACTIVITY NAME: Emergency Response/Aquifer Protection  
Enhancement

AMOUNT REQUESTED: \$61,500

OTHER FUNDING SOURCES AND AMOUNTS: \$2,600 - Missoula County

TOTAL PROJECT COST: \$64,200

PROJECT DESCRIPTION:

The Missoula valley aquifer serves as the sole source of drinking water for 65,000 people in the Missoula valley. In 1988, after extensive review, the Federal Environmental



Protection Agency designated the Missoula valley aquifer as a "Sole Source Aquifer" thereby recognizing the vulnerability of the water source to contamination and the need for special protection.

From 1986 to 1987, the Missoula County Interagency Hazardous Materials Team (HAZMAT) responded to over 25 incidents involving the spill or release of toxic chemicals (mostly vehicle related). Many of these incidents resulted in localized contamination of the Missoula valley aquifer. The primary objective of the HAZMAT team is the protection of life and property, but it is widely recognized that the negative affects to human health and welfare can often be greater due to the resulting environmental degradation than from the original release. For this reason, Missoula County is interested in providing proper training and equipment to the HAZMAT team to allow environmental pollution control to become part of the response strategy. The purpose of this grant request is to train the HAZMAT team through general groundwater flow and pollution control coursework, specific Missoula valley aquifer coursework, and groundwater monitoring and pollution control equipment use coursework, and to purchase pollution control and groundwater monitoring equipment for HAZMAT use.

#### TECHNICAL ASSESSMENT:

The Missoula valley aquifer is presently the sole source of drinking water for the Missoula valley. Investigations into alternate water sources such as the Clark Fork and Bitterroot rivers have not revealed technically and economically feasible alternatives. The aquifer is clearly a valuable resource and merits a high level of protection.

Quick response and proper control activities may dictate the amount and severity of the resulting environmental pollution due to hazardous material spills. In some cases immediate, proper action can prevent pollution altogether. Providing the HAZMAT team with proper training and equipment will likely reduce the extent of environmental degradation associated with hazardous material spills.

The specific training to be provided to HAZMAT members and how that training will be obtained is not well developed. Specific training objectives, coursework, and implementation should be outlined prior to disbursal of project funds. Adequate expertise exists within the state to obtain the basic training required.

The inventory of equipment to be purchased is also not well developed, but the applicant intends to fully develop equipment needs after the training is complete. This will ensure that equipment needs are tailored to the capability of trained personnel. A specific inventory of equipment to be purchased should be approved prior to disbursal of funds for equipment purchase. In addition, some of the equipment purchased may be used infrequently and efforts should be made to make this equipment available regionally to maximize public benefit.

Presently, the state and federal governments, through the Department of Health and Environmental Sciences, USGS, and EPA,

provide groundwater monitoring and pollution control services. Every effort should be made to coordinate with these agencies and other appropriate organizations to minimize duplication of equipment and services and maximize efficiency.

FINANCIAL ASSESSMENT:

The projected project cost is \$64,200 with the following distribution: contract administration - \$2,600 (Missoula County); training - \$16,500 (DNRC); water monitoring and pollution control equipment - \$45,100 (DNRC). The training costs includes four short courses and are consistent with actual costs for short courses of this type. The equipment costs were based on an equipment catalog and seem reasonable, but the inventory of equipment needed is not well developed and the final project cost may reflect this lack of detail.

ENVIRONMENTAL ASSESSMENT:

This project will positively impact the environment by minimizing the impact of individual hazardous material spills.

RECOMMENDATION:

A grant of \$45,000 for the purchase of equipment only is recommended contingent on DNRC approval of the project scope of work and budget. The scope of work must include coordinating efforts with regional governments and the Department of Health and Environmental Sciences.

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APPLICANT NAME: Montana State University

PROJECT/ACTIVITY NAME: Movement of Nitrates into Groundwater

AMOUNT REQUESTED: \$12,840

OTHER FUNDING SOURCES AND AMOUNTS: \$12,720 - Montana  
Agricultural Experiment  
Station

TOTAL PROJECT COST: \$25,560

PROJECT DESCRIPTION:

The Eastern Agricultural Research Center of Montana State University requests grant funds to monitor movement of nitrates through the soil into the groundwater under irrigated agricultural land in the Yellowstone Valley near Sidney. Nitrate concentration in the groundwater will be monitored under spring wheat, sugar beets, and safflower, crops that vary in rooting depth and nitrogen requirements.

In the early 1970s, groundwater was sampled for nitrate concentrations under sugar-beet fields. The samples were

obtained several times throughout the growing season under different soil types and fertilizer rates. Because of improved crop varieties and agricultural practices, yield potentials today are higher than they were in the early 1970s. There is a trend to apply greater amounts of nitrogen fertilizer and there may be higher concentrations of nitrate present in the groundwater today.

The results of this study will be compared to the nitrate concentrations reported in the early 1970s to determine whether the increased use of nitrogen fertilizer has resulted in an increased nitrate concentration in the groundwater.

#### TECHNICAL ASSESSMENT:

Three wells at the upper and lower ends of three fields (18 wells total) will be used to monitor the nitrate levels. Weekly tests will be conducted before field work starts in the spring and through the season until harvest. Periodic tests will continue until freezeup. Three sandpoint wells already in place will be used as check wells for comparison. Soil samples will also be tested for nitrate levels on a monthly basis and before any fertilizer is applied. Irrigation water will be monitored for nitrate levels before it is applied as will the drainage or runoff. Amounts of irrigation water and precipitation will also be measured.

Sandpoint wells will be used because the water table is 5 to 10 feet below the surface. With six wells for each six-acre field, there will be sufficient monitoring to determine what effects nitrates from adjacent fields may have on the test fields. The project sponsor has applied for other grant funds to purchase equipment to test for pesticides. If the equipment is purchased, pesticide monitoring will be conducted in conjunction with the nitrate study.

#### FINANCIAL ASSESSMENT:

The budget appears to be frugal with DNRC grant funds comprising 50 percent of the budget. Grant funds will be used for salaries-(\$4,000), associated costs-(\$6,100), indirect costs-(\$2,140); and contingencies-(\$600). The Montana Agricultural Experiment Station will be paying the administration costs and 64 percent of the labor.

#### ENVIRONMENTAL ASSESSMENT:

The purpose of this study is to monitor environmental effects of agricultural practices. The results may lead to improved crop rotations and better fertilizer and irrigation water management.

#### RECOMMENDATION:

A grant of \$10,700 (\$12,840 less \$2,140 indirect costs) is recommended contingent on DNRC approval of the project scope of work.



APPLICANT NAME: Department of Natural Resources and Conservation

PROJECT/ACTIVITY NAME: Water Reservation Development Program

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: None

TOTAL PROJECT COST: \$100,000

PROJECT DESCRIPTION:

The Conservation Districts Division (CDD) of DNRC requests grant funds from the Renewable Resource Development (RRD) Program to provide monies to Conservation Districts (CD) upon request for preparation of water reservation applications. Approximately 15 Missouri River Basin conservation districts will need financial assistance for a consultant to review the CD water reservation hearings, prepare objections to other water reservation applications, and to review and comment on the draft environmental impact statement. These activities will be performed during 1991.

TECHNICAL ASSESSMENT:

The 1985 Water Marketing Bill established a water reservation process for the Missouri River Basin similar to the Yellowstone River Basin water reservations concluded during the late 1970's. This statute allows the CDs to apply for water reservations in the Missouri River Basin and directs DNRC to provide technical and financial assistance to applicants for water reservations.

Missouri River Basin CDs located above Fort Peck Dam must have their water reservation applications to the Board of Natural Resources and Conservation by July 1, 1989. CDs below Fort Peck Dam must submit their applications by July 1, 1991.

The Conservation Districts Division of DNRC will, upon request, provide funds to the CDs for the processes involved with the preparation of their water reservation applications.

FINANCIAL ASSESSMENT:

Conservation Districts are limited by law to revenues generated by 1.5 mill County assessments, which is not sufficient to meet the costs of preparing the water reservation application. Cost estimates for preparing the water reservation application for each CD range between \$20,000 to \$25,000.

The Renewable Resource Development Act originally anticipated that CDs would need additional funds for water reservation development by earmarking 10 percent of the funds for such purposes; however, the 1987 Legislature removed all earmarked funding under RRD.

In addition to the requested grant amount of \$100,000, DNRC has sought spending authority of \$548,950 for water reservation



application and EIS preparation to assist 13 municipalities and 9 conservation districts for the basin upstream of Fort Peck Dam. The identified funding sources for the \$548,950 are as follows:

DFWP/DHES fees for EIS	\$140,000
Federal Agency fees for EIS	42,000
RIT (earmarked 30 percent)	366,950

ENVIRONMENTAL ASSESSMENT:

Potential environmental impacts as a result of the proposed water development projects will be addressed in the required environmental impact statement.

RECOMMENDATION:

The Conservation Districts Division received \$50,000 in RRD funds from the 1987 Legislature, which is to date unused. This money may be made available to CDs upon request for development of water reservations or preparation of new water reservation application. As such, DNRC recommends a grant of \$32,000 which may be used by Missouri River Basin CDs for water reservation application reviews and preparation of testimony during the BNRC hearings.

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APPLICANT NAME: Cascade County

PROJECT/ACTIVITY NAME: Silver Crest Cross-Country Ski Area  
Improvement and Expansion

AMOUNT REQUESTED: \$74,100 Grant

OTHER FUNDING SOURCES AND AMOUNTS: \$1,695.95 - Cross-Country Club  
\$10,000 - Cross-Country Club Volunteer  
\$2,000 - Forest Service Tech/Materials

TOTAL PROJECT COST: \$87,795.95

PROJECT DESCRIPTION:

Cascade County, on behalf of the Great Falls Cross-Country Club, is requesting funds to purchase a Kasebohrer PB070DR snow-grooming machine. The club is responsible for maintenance and grooming of the ski trails at the Silver Crest Cross-Country Ski area. The grooming is presently being done with a 1979 Skidoo Snowmobile. Grooming is done once a week (in season) and takes five to six hours. The new machine will replace the snowmobile. Of the total request, \$14,000 is to be used for construction of a building to store the groomer during the off season. The

building will be on Forest Service property at the top of Kings Hill Pass on Highway 89. It will be a 16 x 24 foot log structure with 12 foot walls, a dirt floor and a metal roof.

#### TECHNICAL ASSESSMENT:

The 12 km of trails are presently groomed once a week, which takes 5 to 6 hours per grooming. Trails are 10 to 12 feet wide and require 3 passes with the existing 3-foot wide snowmobile. The club's 3 to 5 year trail development plan would possibly double the trail distances. Three trail groomers were evaluated. Of the three considered, the PB070DR appears to be the best choice for the size and distance of the trails. Considerable time would be saved as the PB070DR should do the job in one pass in most cases.

The cross-country club has looked into using either the snowmobile club's groomer or the groomer at Showdown ski area. Both of these machines are too large (wide) for the existing cross-country trails. Other lease-rent options have not been investigated. Used machines of the proper size appear to be rare. The present method of grooming is to pull a packer or track sled with the snowmobile. This method does the job satisfactorily even though the club feels the time needed is excessive. The club has been able to hire a person from the Neihart area to run the existing snowmobile so it hasn't had to pay mileage or driving time.

#### FINANCIAL ASSESSMENT:

Of the \$74,100 grant requested, \$60,100 would be used to purchase the groomer with the desired attachments. \$14,000 would be used to build the 16 x 24 log garage. The ski club would contribute \$1,695 which would go for maintenance, groomer's wages, and insurance the first year they have the groomer. An estimated \$10,000 worth of club volunteer time will go into trail expansion. An estimated \$2,000 contribution by the Forest Service will be in the form of technical assistance.

Present annual costs of grooming are: \$300 repair and maintenance of the snowmobile, \$75 gas & oil, \$750 wages. This totals \$1,125 annually. With the planned trail expansion this annual cost would increase to around \$2,000. The new groomer would have the capability of doing the job in half the time which would save about \$500 to \$750. DNRC questions whether a capital expenditure of \$74,100 can be justified by an annual saving of \$750.

#### ENVIRONMENTAL ASSESSMENT:

Environmental impacts will be minimal. The ski trails are groomed presently with a smaller machine.

#### RECOMMENDATION:

A grant of 50 percent of the cost for a suitable machine is recommended up to a maximum of \$30,000 contingent upon DNRC approval of scope of work and budget. No grant funds will be allowed for the building.

APPLICANT NAME: Lewis and Clark County

PROJECT/ACTIVITY NAME: Voluntary Agricultural Land Conservation Program

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: \$4,553 - Lewis and Clark County

TOTAL PROJECT COST: \$104,553

PROJECT DESCRIPTION:

Lewis and Clark County is requesting grant funds to establish an agricultural land conservation program which would protect high value, selected agricultural lands in the county through the purchase of development rights (PDR). A PDR is a voluntary deed restriction in which the landowner serves and sells the rights to develop his or her land (other than for agricultural purposes) in exchange for a monetary amount or for other property. The compensation awarded to the landowner is the value of the development right, as determined by a registered land appraiser who establishes the difference between the development potential value of the land and its agricultural value.

TECHNICAL ASSESSMENT:

Similar agricultural land protection programs have been implemented and proven successful in various parts of the country, including King County, Washington and Suffolk County, New York.

In preparation for the program, Lewis and Clark County has developed a ranking system for selecting and evaluating lands to be kept in agriculture, designed model conservation easement provisions, and held discussions with a local land trust that would monitor the easements to ensure the lands remain undeveloped. Lewis and Clark County has also prepared an inventory of county-owned lands, analyzing which parcels no longer serve public purposes and can be sold. Proceeds of those sales have been deposited in a fund that the county intends to use towards purchasing development rights. The county is presently prepared to evaluate and rank proposals from landowners who wish to sell their development rights and permanently protect their agricultural land.

FINANCIAL ASSESSMENT:

The cost of a PDR project is high. The applicant estimates that grant funds, when combined with other county resources, may be able to protect from 150 to 500 acres depending on 1) cost of development rights, 2) potential of philanthropic gifts and

donations, and 3) supplemental acquisition of monies from other public resources.

The project's total budget may range anywhere from \$125,000 to \$275,000 depending on the above items as well as the outcome of county land sales that will occur within the next few years.

Of the \$100,000 requested, \$27,280 will be used for administration and \$65,820 for development right acquisition and \$6,900 for professional/technical costs.

ENVIRONMENTAL ASSESSMENT:

The environmental impacts of a project of this nature should be positive, in that the land for which development rights have been severed will remain in agricultural use and open space.

RECOMMENDATION:

DNRC recommends that the administrative costs of this project not exceed \$15,000. A grant of \$85,000 is recommended contingent on DNRC approval of scope of work and budget.

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APPLICANT NAME: Flathead Conservation District

PROJECT/ACTIVITY NAME: Flathead County Groundwater Study

AMOUNT REQUESTED: \$97,077

OTHER FUNDING SOURCES AND AMOUNTS: \$6,697 Flathead Conservation District (in-kind)

TOTAL PROJECT COST: \$103,774

PROJECT DESCRIPTION:

Flathead Conservation District is proposing a groundwater characterization study of the aquifer underlying the one-third of Flathead county that is comprised of privately-owned lands. One of the two major aspects of the project is the definition of the major aquifers and the establishment of an automated regional groundwater monitoring network in the aquifers of the Flathead Valley area. The other overall objective is a broad study of aquifer characteristics and water quality in the same systems, based on sampling and testing of selected existing wells.

The project will be administered by the Flathead Conservation District. A private consulting firm will provide the technical support. In addition, a technical advisory committee will provide guidance and direction to the project. Long-term monitoring and data entry support will be the function of the DNRC Water Rights Field Office in Kalispell.

The major emphasis of the project will be on the long-term monitoring of approximately twelve selected existing wells developed into major defined aquifers in the Flathead Valley. The monitoring program is intended to provide a groundwater data



base which will allow various resource agencies and private parties to determine potential groundwater availability and to differentiate natural water level variations from man-caused variations. Increasing demands on groundwater resources, upcoming adjudication, and the recent drought necessitate the definition of the reliable potential yield of these aquifers.

The second major aspect of the study will define the present quality of the major defined aquifers, particularly with respect to pesticide contamination. Samples will be collected from each of the wells to be instrumented, as well as others.

#### TECHNICAL ASSESSMENT:

The demand on the use of groundwater is increasing in the Flathead Valley, as well as in other areas of the state. More aquifer characterization and groundwater information would result in better informed decisions and wiser management of the groundwater resource. DNRC has no argument with the need for more data.

However, comments from outside reviewers of this proposed project question whether the monitoring program as described would actually provide the data needed to make better informed management decisions. Criticisms have been raised concerning the monitoring of wells which are being actively pumped, and the monitoring of a small number of wells over too large an area to provide meaningful groundwater state levels and use demands. The applicant states that the use of existing "pumping" wells for long-term monitoring purposes will minimize the cost of the monitoring program. However, the results obtained from the "pumping" wells may not allow researchers to distinguish long-term natural water level changes from man-caused effects related to groundwater pumping.

#### FINANCIAL ASSESSMENT:

Test pumping, instrumentation of the 12 selected wells, training of staff for data collection, and water quality sampling for the presence of pesticides would be completed within six months.

Flathead Conservation District will provide \$6,697 as in-kind services for project administration. Professional costs for salaries and benefits for a hydrologist and surveyor are budgeted at \$44,800. Installation of monitoring equipment on the 12 wells is budgeted at \$11,400 for labor and \$20,220 for equipment. Laboratory costs for water sample analysis is \$12,000.

#### ENVIRONMENTAL ASSESSMENT:

This monitoring study will not result in any significant environmental impacts, although the results could lead to improved groundwater management decisions.

#### RECOMMENDATION:

DNRC recommends no funding for this project. Although DNRC recognizes the real need to improve groundwater resource management through improved resource data collection, it appears

that this monitoring program as proposed would not provide the data which the applicant or other resource managers or users need. DNRC recommends the applicant more thoroughly document groundwater information needs in management problem areas, and design and propose a more intensive monitoring program in those selected areas with possible technical advisory and review input from agencies with acknowledged groundwater expertise.

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APPLICANT NAME: Montana State University

PROJECT/ACTIVITY NAME: Development of Water Quality Criteria  
for Range Watersheds

AMOUNT REQUESTED: \$76,506

OTHER FUNDING SOURCES AND AMOUNTS: \$70,669 - Montana  
Agricultural Experiment  
Station

TOTAL PROJECT COST: \$147,175

PROJECT DESCRIPTION:

The Animal and Range Science Department of Montana State University is requesting funding to establish baseline data for natural levels of suspended sediment, upland erosion, and seasonal and annual changes in streamflow of an ungrazed watershed. Information generated by the proposed five year study will be used to develop criteria for monitoring the effectiveness of nonpoint source pollution control through rangeland best management practices. The length of time for streamflow, sediment delivery, and suspended sediments to return to pre-storm or pre-runoff levels will be monitored for five years. The time the stream takes to recover would then be used in evaluating the impact of erosion and sedimentation in grazed watersheds. Records of streamflow, groundwater recharge, stream channel morphology and instream sediment loads will be kept for the five years. This information will be used to develop response time curves for sediment yields, streamflow and nonpoint source pollution in the study area. These response curves will then be used to develop water quality criteria for range watersheds.

The study site has not been selected at this time, but the area should be: 1) 200 to 400 hectares in size (494 to 988 acres); 2) drained by a perennial stream; 3) ungrazed, or grazing could be deferred for five consecutive years; 4) undisturbed by recent mining, logging, or major recreation in the basin headwaters; and 5) within 100 miles of Bozeman.

TECHNICAL ASSESSMENT:

Stream flow and sediment loads will be monitored with a pressure transducer placed in a stilling well connected to a

datalogger. Stream sediment loads will be measured via water column turbidity with the same datalogger. Piezometer wells of perforated PVC pipe will be used to monitor groundwater levels in the primary floodplain. Bimonthly water level measurements will be taken from March to November and monthly the rest of the year. Cross-sectional transects will be established in each hydrologic zone to determine stream channel morphology. Cross sections will be measured periodically. Climatological data will be recorded on a 24 hour basis in the lower and mid-elevation levels while the upper elevation will be monitored from April to November. Water content of the snowpack will be checked monthly during the winter months. Vegetative cover and amount of bareground will be measured by random sampling and from air photos. The primary focus of this study will be to calculate the amount of variation in streamflow, suspended sediment load, groundwater level, and channel morphology for each zone by season and between years.

Site selection will be difficult because game ranges (as suggested in the application) receive heavy seasonal grazing. At any rate, the site will need to be identified before funds are committed. The suggested wide application is questionable as no two watersheds are the same in natural characteristics and grazing pressure.

#### FINANCIAL ASSESSMENT:

The Montana Agricultural Experiment Station is providing \$70,669 towards this project, largely through contributions of salaries and benefits totalling \$61,325. Grant monies would be used for salaries for a graduate research assistant and field technician (\$37,311), laboratory costs, equipment, and supplies (\$22,495), and travel (\$14,200).

#### ENVIRONMENTAL ASSESSMENT:

This study will not result in any environmental impacts, however, if successful, results could lead to improved, long-term rangeland management.

#### RECOMMENDATION:

DNRC recommends no funding for this project.

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APPLICANT NAME: Montana Bureau of Mines & Geology

PROJECT/ACTIVITY NAME: Groundwater Training Center

AMOUNT REQUESTED: \$100,000

OTHER FUNDING SOURCES AND AMOUNTS: \$5,000 - Montana Bureau of  
Mines & Geology  
\$103,200 - Participant Fees



TOTAL PROJECT COST: \$208,200

PROJECT DESCRIPTION:

The applicant contends that increasing public awareness and expanded state and federal programs have greatly increased the competition for groundwater professionals and make it difficult for state agencies to hire and retain staff trained in groundwater disciplines. Opportunities to train staff include on-campus college coursework, correspondence coursework, and short courses offered at out-of-state locations.

The project sponsor proposes to provide a cost-effective means for state agencies to upgrade the groundwater skills of their staff by offering a series (15 courses/year) of three to five day short courses for scientists and engineers. The courses would be offered at regional centers such as Billings and Helena and cover a variety of groundwater topics (pump testing, sampling, modeling, and hydrogeology). The objective is to meet the needs expressed by agencies while developing the infrastructure for a self-sustaining program to meet the needs of all Montanans.

During the two-year term of the requested grant, the course participants will be charged \$50 per day. Once the program is established, this charge will be increased to \$100 per day per participant. This compares to an average of \$350 per day for out-of-state short courses.

A program director will be hired to manage the Groundwater Training Center. His or her responsibilities will include surveying state agencies, setting course priorities, selecting instructors, assisting with course material preparation, overseeing course performance and evaluating past course performance. Half of the program director's salary will be paid with the grant and the other half from participant fees.

TECHNICAL ASSESSMENT:

It is likely that the project sponsor can provide quality groundwater short courses that will meet the needs of state agencies. However, whether there is adequate demand for such courses is not documented. At a minimum, 10 participants per course would be required to cover course costs and another 5 to 7 would be required to cover that half of the program director's salary not covered by the grant. The project sponsor is anticipating 10 to 25 participants per course, of which 75 percent will be state agency employees. A rough review of state agencies involved in groundwater management indicates that only 10 to 15 individuals are actively involved and another 30 to 50 are passively involved. Although these numbers are rough, they clearly suggest a lower level of participation from state agencies than would be required to cover course cost and salary. In addition, the actively involved groundwater professionals are going to have significantly different needs than those passively involved; the two groups are not complementary. Also, certain state agencies have access to USGS training as cooperators.



Other potential participants include federal government employees, local government employees, and private organizations. The federal government may have limited involvement given federal training courses through the USGS and EPA.

Local government has a large pool of potential participants in the form of sanitarians, planners, and public works personnel, but may have significantly different needs than those of state agencies. Some local officials have suggested that there is no need for detailed groundwater training, but there may be some need for basic groundwater training. This could be handled through one or two large training sessions sponsored by local government associations and tailored to local government needs.

Private organizations that may be interested include, environmental and engineering consultants, mining companies, technical assistance associations, and water well contractors. There is probably a limited number of consultants (less than 30) that would be interested in this type of training and they would likely require high quality coursework. On the other end of the scale, water well contractors would probably want basic information. It is difficult to assess the level of participation from the private sector, but expectations are that it would be fairly limited.

In summary, the project sponsor will be able to provide quality coursework, but will likely have difficulty averaging the minimum of 10 participants per course, especially if the coursework offered is highly technical.

#### FINANCIAL ASSESSMENT:

The project sponsor proposes to use the \$100,000 grant to initiate the groundwater training center with the ultimate goal of developing a self-sustaining program funded by participant fees. Initial fees will be \$50 per day, per course, per participant with those fees increasing to \$100 per day after the two year grant term. The program must raise \$103,200 in participant fees over two years to cover costs; of this, \$50,000 is required for course costs including instructors and \$53,200 is required for the program director's salary and fringe benefits. Based on 30 courses over 2 years and an average of 4 days per course, the enrollment would have to average 9 participants per course to cover course costs (instructors, supplies, etc.) and 17 participants per course to pay the program director's budgeted salary. Based on the discussion in the technical assessment regarding participation, it may be difficult to cover course costs not to mention the 50 percent of the program director's salary funded by participant fees.

#### ENVIRONMENTAL ASSESSMENT:

The operation of the Groundwater Training Center will have no environmental impact. Enhanced understanding of the groundwater system and groundwater sampling, protection and development techniques will likely have a positive impact on the environment.

RECOMMENDATION:

The project sponsor has not adequately established a demand for groundwater training that would support the proposed Groundwater Training Center. For this reason, DNRC recommends no funding.

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APPLICANT NAME: Department of State Lands

PROJECT/ACTIVITY NAME: Forestry BMP Education Project

AMOUNT REQUESTED: \$90,852

OTHER FUNDING SOURCES AND AMOUNTS: \$8,618 - DSL (in-kind)

TOTAL PROJECT COST: \$99,470

PROJECT DESCRIPTION:

The Forestry BMP (Best Management Practice) Education Project represents a two-year effort to educate timber operators, private forest landowners, and conservation districts in the use of forest management practices that protect water quality. The project will be headed by a coordinator working for the Forestry Division of the Department of State Lands in Missoula. The coordinator will conduct a series of educational workshops and training seminars, provide technical assistance, carry out field assessments, work with landowners to establish demonstration sites, and prepare and distribute printed and video materials. The target audience of the project is the many timber operators and landowners who are actively managing Montana forests but who are not adequately informed about the use of BMPs in protecting Montana watersheds.

TECHNICAL ASSESSMENT:

The project coordinator will develop the educational materials from existing information available in Montana and other states. DSL has written material, slide/tape programs, and videos. This information and information from other sources will be organized into a coherent package applicable to Montana operators.

Once the information package is developed, workshops will be conducted for loggers, logging contractors, consulting foresters, landowners, conservation district officials, state agencies, and others involved in managing forests in Montana. Workshops will be designed to draw on participants' "real world" experience and will include visits to demonstration sites when possible.

An advisory committee will be established to oversee the project and provide recommendations. This committee will consist of agency personnel and a broad range of interest group representatives.

FINANCIAL ASSESSMENT:

The proposed budget appears reasonable and adequate. Grant funds from DNRC are 90 percent of the total with DSL in-kind services contributing 10 percent. Salaries and benefits are \$59,010; associated costs \$26,700; and a 6 percent inflation factor of \$5,142 is included.

RECOMMENDATION:

DNRC recommends no funding for this project. DNRC supports education of timber operators, private forest landowners, and conservation districts as to the Best Management Practices. However, this is a long-term program and the RRD program is not a long-term funding source.

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APPLICANT NAME: Whitefish County Water and Sewer District

PROJECT/ACTIVITY NAME: Geology and Groundwater Resources of the  
Whitefish County Water and Sewer District

AMOUNT REQUESTED: \$89,520

OTHER FUNDING SOURCES AND AMOUNTS: \$6,430 - Whitefish County  
Water and Sewer District  
\$16,526 - Montana Bureau of  
Mines and Geology/University  
of Montana

TOTAL PROJECT COST: \$112,476

PROJECT DESCRIPTION:

In 1981, dye tests performed by the Flathead County sanitarian revealed that septic tank effluent was entering Whitefish Lake from sites along the east shore. The sanitarian also confirmed septic tank failures around the lake. In addition, a 1982 limnology study of Whitefish Lake classified the lake as somewhat less than pristine and noted that late summer oxygen deficits indicate a trend towards declining water quality. This study also classified the lake as phosphorous limited and suggested three possible sources of contamination: sediment laden surface water inflow, precipitation, and groundwater inflow.

To respond to this problem and other water quality problems in the Whitefish Lake area, residents formed the Whitefish County Water and Sewer District. The intent was to provide a legal framework under which a comprehensive water quality management plan could be developed and implemented. The district includes 39,000 acres around the lake and services approximately 2,200 individuals. The district was formed in 1982 and does not include the City of Whitefish.

In 1983 the district was awarded a \$100,000 DNRC grant to



complete a resource inventory and management plan for the district. This grant was amended in 1984 to include a septic tank leachate study. The leachate study found groundwater inflow to be less than 1 percent of the total lake water budget and contributes 0.3 percent of the total soluble phosphorous load to the lake. The district has also completed a facilities plan that investigated alternatives to individual septic tanks. The recommendation is to install a central pressure sewer collection system that connects to the City of Whitefish treatment plant. The district is pursuing this recommendation. The district now proposes a groundwater study that will inventory and characterize the district's groundwater resources and is intended as a logical extension of the natural resource inventory. The district envisions using the study as a basis for land use regulations and to help convince residents of the need for a central sewer collection system.

The proposed study will collect existing geologic and well driller's data and supplement this data with seismic testing of the valley fill and water level, water quality, and pump testing data collected from existing wells. Also, recharge and discharge zones will be identified based on geologic features and checked with water quality data. The anticipated results of this study effort are:

- A geologic map of the district including depth of valley fill
- A potentiometric or depth-to-groundwater map
- Identification of groundwater recharge zones and flow paths
- Location of individual groundwater aquifers and the water quality data specific to each aquifer
- Identification of the hydraulic properties of the aquifer

The project will be supervised by a private consultant (hydrogeologist), but the majority of the work will be performed by a graduate student from either the University of Montana or the Montana Bureau of Mines and Geology. An appropriate faculty member will also supervise the student. A hydrogeologic technician will be provided by the private consultant to assist the student with field work.

#### TECHNICAL ASSESSMENT:

One of the issues discussed in the application is the need to convince residents that a central sewer system is required to protect Whitefish lake from further water quality degradation. However, the link between this issue and the groundwater study is not clearly established. Seepage of septic contaminated groundwater into Whitefish lake and the location of septic leachate plumes has been established by dye tests and a leachate study performed on behalf of the district. The leachate study also quantified the groundwater inflow to the lake in terms of the overall water budget and concluded septic contaminated groundwater seepage has a small impact on lake eutrophication. Although the proposed groundwater study will further characterize



groundwater flow into the lake and enhance the districts understanding of the groundwater/lake interaction, it will not document the impact of septic leachate on the lake.

The county sanitarian and engineers hired by the district have identified a significant number of failed septic systems within the district. It is reasonable to suspect that these failures may be degrading groundwater quality and could result in contaminated wells. Although this particular groundwater study is not a water quality effort, it will collect some water quality data that may document localized water quality problems. No other groundwater contamination threats beyond the septic system failures have been documented. Farming and industry within the valley are somewhat limited. Future development along the lake shore is a potential threat and the district intends to use the groundwater data generated through the proposed study effort as a basis to develop land use regulations such as zoning laws and septic regulations. Specifically, how this data would be used to accomplish this end is not described.

#### FINANCIAL ASSESSMENT:

Project costs are distributed as follows: project administration \$8,660 (50 percent DNRC); office rent \$4,200 (50 percent DNRC); private hydrogeologist consultant \$19,800 (100 percent DNRC); private hydrogeologist technician \$24,000 (100 percent DNRC); graduate student \$19,600 (100 percent DNRC); university faculty \$15,360 (100 percent MBMG); technical supplies and lab \$20,456 (95 percent DNRC, 5 percent MBMG). Overhead costs are included for the private consultant (hydrogeologist & technician) and based on a multiplier of 2.5. The private consultant will spend 10 weeks over 2 years on the project and the technician 6 months.

The university may be able to provide some of the equipment that is being proposed for purchase. This should be investigated prior to project funding.

Whether or not the proposed budget is adequate to realize the project goals is difficult to determine and will depend on what the study team finds in the field. Availability of test wells, their location, existing data, and geologic conditions will all play an important part in the budget and project success.

#### ENVIRONMENTAL ASSESSMENT:

The proposed project is primarily a study effort and will have limited or no impact on the environment. A more thorough understanding of the aquifer could result in improved land management and an enhanced environmental condition.

#### RECOMMENDATION:

DNRC recommends no funding.

## CHAPTER IV

### WATER DEVELOPMENT PRIVATE LOAN PROGRAM

The Private Loan Program is a part of the Water Development Program established in 1981 by the Montana Legislature to promote the beneficial use of water by private entities. These entities may be individuals, partnerships, or corporations. The maximum loan per project is \$200,000. Eligible projects and activities include those which conserve, protect, develop, store, distribute, and enhance water resources through efficient use and management. Eligible projects include but are not limited to erosion control, irrigation dam construction or repair, ditch lining or consolidation, irrigation system automation or rehabilitation, and irrigation system construction.

Applications are accepted at any time, and are reviewed by the DNRC for completeness, eligibility, repayment ability, and adequacy of loan security. Each project must include information to determine technical, economic, and financial feasibility. The DNRC director makes the final funding decision.

The Water Development Program authorizes DNRC to issue up to ten million dollars in Water Development General Obligation Bonds, and to use the proceeds for loans.

The 1981 Legislature initiated the loan program by designating \$350,000 of Renewable Resource Development funds for loans. In addition to the RRD funds, the following four bond sales provided proceeds for private loans:

<u>Sale Date</u>	<u>Amount</u>	<u>Interest Rate</u>
October 1983	\$1,300,000	7.20%
October 1984	\$ 900,000	8.71%
July 1985	\$1,000,000	7.22%
December 1985	<u>\$1,000,000</u>	6.92%
	\$4,200,000	

As of November 1988, 59 private loans have been approved. A total of \$3,687,352 has been advanced, while \$94,156 is committed to projects but has not yet been disbursed.

The 59 loans fund the following types of projects:

- 33 Sprinkler Irrigation Systems (9 are gravity systems)
- 7 Irrigation Canal Rehabilitation Projects
- 8 Rural Water Supplies
- 1 Streambank Stabilization Project
- 1 Irrigation Canal Weed and Moss Catcher
- 1 Gated Pipe Irrigation Project
- 1 Cablegation Irrigation Project
- 1 Irrigation Water Storage Project

## 2 Hydropower Projects

The canal rehabilitation and canal weed and moss catcher projects affect 27,510 acres. The sprinkler systems, gated pipe, cablegation, and storage projects affect 8,190 acres.

## CHAPTER V

### EMERGENCY GRANT FUNDS

A total of \$125,000 was earmarked as emergency grants for water development projects for the 1988-89 biennium should they be needed. Because of the extreme water shortages as a result of the 1988 drought, DNRC received emergency grant requests and approved the use of such funds for three projects. A brief description of each project follows.

#### 1988 DNRC Emergency Grant Requests

##### Melstone

On September 1, 1988, the Town of Melstone submitted a request for an emergency grant to the DNRC. The town was faced with an emergency situation due to the lack of water in the Musselshell River. The Musselshell River is the sole source of water that supplies the domestic needs of the community. The primary source for the Musselshell River water is the Deadman's Basin, located 85 river miles from Melstone. At the time of the request, all available water in Deadman's Basin was projected to run out within the week. As a result, it was highly probable that the Town of Melstone would be without water for its municipal supply within a few weeks. One of the principal problems was the overuse of irrigation water by upstream users during the dry spring and summer months of 1988.

Consequently, this emergency situation necessitated that the town take immediate measures to protect the residents of Melstone. In response to this situation, the town hired Morrison-Maierle Inc. to prepare the emergency application and investigate a buried river channel of the river at a cost of \$13,387 to potentially provide a long-term solution. The town then took the initiative to construct a 2.9 million-gallon, raw water storage reservoir with a local contractor and some volunteer help. The completed raw water storage reservoir was used to store any remaining flows in the Musselshell River for future usage through the winter. Costs for this portion of the project were \$14,289.

##### Ingomar

On September 8, 1988, the Ingomar Water District submitted a request for DNRC emergency grant funding to alleviate its water shortage problems. The residents of Ingomar were left without a water supply when a developed spring used as their water source dried up during the summer of 1988. As a result, the Ingomar Water District was forced to hire a truck and water tanker to haul water from Billings and Forsyth to supply its domestic needs. The Ingomar Water District has requested emergency funding to purchase a used semi-tanker trailer and a three-inch



pump and hose to pump the water into the existing storage tank; to cover fees to pull the trailer from Forsyth to supply six months of water; and to cover the costs of the water, license, fees, repairs, and maintenance. Total costs were estimated at \$8,894.

#### Teton Bench Water Association

On September 17, 1988, the Teton Bench Water Association (west of Fort Benton) requested DNRC emergency funds to alleviate its water shortage problems. The Teton Bench Water Association is comprised of 15 households, all of which were forced to ration water, and some of which were forced to haul water for domestic purposes. The Teton Bench Water Association had a 20-foot section of perforated pipe located near the dried-up Teton River that conveyed water to a holding well and then pumped to the users. Due to the drought conditions of the summer of 1988 and increased irrigation demand, the Teton River dried up. After exposing the existing perforated pipe, it was found to be in a deteriorated condition and nearly unusable. The Teton Bench Water Association has requested emergency grant funds to replace and extend the existing infiltration pipe to solve its water problems. Total cost for this project is \$7,252.

## CHAPTER VI

### DEVELOPMENT AND IMPLEMENTATION OF WATER RESERVATIONS

#### BACKGROUND

Montana's Water Use Act, passed by the 1973 Legislature, gave public entities the unique opportunity to apply to the Board of Natural Resources and Conservation (Board) to reserve water for future beneficial uses or for protection of a minimum flow level, or quality of water.

The water reservation statute has been exercised in the Yellowstone River Basin. The Board granted water reservations to eight municipalities, fourteen conservation districts (CDs), four state agencies, two federal agencies, and one irrigation district in 1978. Currently, there are water reservation applications pending or being prepared in two other Montana basins, the Missouri and the upper Clark Fork.

#### Amendment of Water Reservation Rules

The water reservation rules had to be amended during the biennium in response to statutory changes made by the 1987 Legislature. The most significant amendment was the development of a procedure for subordinating Missouri Basin water reservations with 1985 priority dates to later-priority water use permits in accordance with the guidelines provided in 1987 legislation. Some minor clarifying amendments were also made on the basis of comments received since the last rules revision and based on experience gained in administering the statute. An early draft of the proposed amendments was widely circulated, and comments were incorporated into the draft. A notice was then officially published and a hearing was held. The only comment received at the hearing was from the Department of Fish, Wildlife and Parks. The Board of Natural Resources and Conservation responded to this comment, and the amendments became final November 11, 1988.

#### YELLOWSTONE BASIN WATER RESERVATION PROCEEDING

On December 15, 1978, the Board approved water reservations for present instream flow and future municipal, agricultural, and multipurpose uses in the Yellowstone River Basin. The Board specified the following priorities and amounts of water:

- First:           Municipal reservations - 60,913 AF
- Second:        Instream flow reservations upstream of Billings -  
                  3,914,555 AF, measured at Billings
- Third:           Irrigation reservations - 650,324 AF
- Fourth:         Instream flow reservations downstream of Billings -

5,429,310 AF measured at Sidney

Fifth: Multipurpose/Storage reservations - 1,111,000 AF

The reservations approved by the Board include 567,261 acre-feet of water per year to 14 CDs, primarily for irrigation. To avoid speculation, the Board established specific requirements to assure due diligence in the development of these reservations. Each CD must prepare a general development plan, a detailed plan for each potential project, and an annual report. The Board is required to review these products at least every ten years to determine if the objectives of each reservation are being met. It then retains the authority to extend, modify, or revoke a reservation.

#### DNRC Assistance to Conservation Districts

As new reservants, the CDs soon realized they were understaffed and unable to comply with the December 15, 1981 deadline for completing the general development plans. In response, the 1979 Legislature amended the reservation statute to require the DNRC to provide administrative and technical assistance to the CDs. The DNRC hired two irrigation specialists in 1981 to serve as liaison between the districts and the Board, and to provide direct staff assistance to each CD at the local level.

To meet the Board's administrative requirements, the CDs requested and obtained an 18-month extension for submission of their general reservation plans to the Board. Subsequent discussions with the Board resulted in two levels of detail for reservation plans. A general reservation development plan would be required by July 1, 1983 and would include information pertinent to reservation development and administration from a general, long-term perspective. A second, more detailed plan would be required for each project before it could be developed.

The general development plans were drafted by the DNRC and approved by the CDs during the 18 months preceding the July 1, 1983 deadline. Subsequently, these plans were approved by the Board. During this period, DNRC also prepared an evaluation of water availability in the Yellowstone River Basin which took into account the eventual development of all reserved water.

After the general development plans were approved by the Board, individuals within the CDs could begin applying to use the reserved water. The CDs require individuals to complete and submit applications for each project to the appropriate CD. After the applications are approved by the CDs they are then submitted to the Board for final approval. The DNRC assists potential applicants in preparing the detailed irrigation plans and in completing the application forms.

## Use of Reserved Water

As of November 2, 1988, 14 CDs had 82 projects authorized by the Board. These projects would use 23,886.6 acre-feet of reserved water per year. Numerous other applications are currently being processed. The following table shows the progress of CDs in developing their reserved water.

### APPROVED USE OF CD RESERVED WATER

Conservation District	No. of Projects Approved	Project Water Approved	Reservation Remaining
		<u>Acre-Feet</u>	<u>Acre-Feet</u>
Custer County	8	1,512.6	26,965.4
Dawson County	3	1,494.8	44,360.2
Little Beaver	27	1,354.1	11,418.9
Prairie	6	4,305.0	64,162.0
Powder River	18	5,737.5	7,942.5
Rosebud	6	457.6	86,545.4
Richland County	2	781.0	44,839.0
Treasure County	1	1,500.0	16,861.0
Park	2	1,200.0	62,925.0
Sweet Grass County	5	4,827.0	41,418.0
Stillwater	1	44.0	16,711.0
Carbon	2	253.0	22,423.0
Yellowstone	1	420.0	57,543.0
Big Horn	0	0.0	20,185.0

Use of reserved water has been greatest in the lower Yellowstone Basin, which has historically experienced more irrigation development than the upper basin. Much of the reserved water development in the lower basin has occurred in the Powder River drainage where water-spreading projects are usually economically feasible. The upper basin has developed less reserved water because of higher development costs, and a shorter growing season combined with depressed farm prices.



In spite of the depressed agricultural economy, all 14 conservation districts have been actively promoting the use of their reserved water. DNRC has assisted the CDs with a number of public informational and promotional efforts including preparation of newsletters, fact sheets, and brochures. Many districts have held public meetings or presented fair exhibits to spread the word on the availability of reserved water. Six CDs in the Lower Basin have used Renewable Resource Development Program funds in determining the economic feasibility for developing some of the lands for which water was reserved.

The development of irrigation reservations in the Yellowstone River Basin is an ongoing process. As required by statute, the Board must review the progress of the CDs in developing their reserved water at least once every ten years.

In 1988, the Board of Natural Resources and Conservation initiated the ten-year review of the Yellowstone River Basin water reservations granted December 15, 1978. The Board asked each reservant to submit a ten-year reservation report to demonstrate that the objectives of their reservations were being met. The reports were due August 19, 1988, and were reviewed along with DNRC's recommendations at the September Board meeting. Due to questions raised at this Board meeting, the Board granted conditional approval of the department's recommendations for each reservation contingent on possible future action following notice of the review process and comment period. Specific comments must be received by December 1, 1988. Reservants with interest in the initial comments must respond by February 2, 1989. The Board will then review the comments and responses at a meeting after the deadline and finalize action on the ten-year review.

#### Missouri Basin Water Reservation Proceeding

The 1985 Legislature directed the DNRC to coordinate a proceeding to establish water reservations in Montana's Missouri River Basin. A basinwide system of water reservations is felt to be a strong basis for claiming Montana's share of the Missouri's flow. Water reservations will provide comprehensive, basinwide planning documents for the future development of water and the protection of instream flows.

In view of limited financial resources, an extended planning period has been established for completing the water reservation process. The basin and the proceeding have both been bifurcated at Fort Peck Dam. Correct and complete water reservation requests from qualified applicants upstream of Fort Peck Dam must be received by July 1, 1989. The Board of Natural Resources and Conservation is required to make a final determination on these applications by December 31, 1991. The interim period will be used by DNRC to evaluate the applications and prepare an environmental impact statement (EIS) and for the Board to hold a contested case hearing. Those applicants below Fort Peck Dam

are to submit correct and complete applications by July 1, 1991. The Board must act on such applications by December 31, 1993.

Funds were appropriated to the departments of State Lands, Health and Environmental Sciences, and Fish, Wildlife and Parks to assist in the preparation of water reservation applications. In addition, an appropriation was made to DNRC for purposes of coordinating the proceeding and assisting interested conservation districts and municipalities upstream of Fork Peck Dam with the preparation of their applications.

Applications have been completed by a consulting firm for three conservation districts and five municipalities upstream of Canyon Ferry Dam. In addition, a draft application has been received from the Bureau of Land Management for instream flow protection in tributaries upstream of Canyon Ferry. One irrigation district has indicated an interest in preparing an application to serve lands upstream of Canyon Ferry.

A consulting firm was also contracted to prepare applications for 11 municipalities between Canyon Ferry and Fort Peck dams. Department staff are also working to prepare water reservation applications for conservation districts in the same portion of the basin.

The Bureau of Reclamation has submitted a draft application to reserve water for a diversion on the main-stem Missouri River at Virgelle. The departments of Health and Environmental Sciences and Fish, Wildlife and Parks are actively developing water reservation applications. After a study of the potential for new irrigation development on state-owned lands in the Missouri Basin, the Department of State Lands has decided not to prepare a water reservation application for the Missouri River Basin.

Other DNRC activities have included assisting conservation districts in conducting landowner interest surveys, conducting irrigable land and water availability studies, developing a methodology for preparing conservation district water reservation applications, preparing a study plan to model the hydrology of the entire basin, beginning preliminary environmental studies, and contacting potential applicants in the lower basin.

Two water reservation applications and one water reservation study have already been received from public entities in the lower basin. The two conservation districts in Roosevelt County have applied to reserve surface flows for major projects adjacent to the Missouri River, and the Sheridan County Conservation District has applied to reserve ground water. McCone Conservation District has completed a landowner interest survey and a resource inventory on projects identified through that effort. These applications will not be acted on until all other applications in the lower basin have been received.

## Clark Fork Basin Water Reservation Applications

During 1987, the Department of Fish, Wildlife and Parks (DFWP) and the Granite Conservation District (GCD) applied for reservations of water in the upper Clark Fork Basin. DFWP applied for instream flow reservations in the Clark Fork main stem above Milltown and in 17 tributaries of the upper Clark Fork. GCD initially applied for reservations to develop two storage facilities in the Flint Creek drainage. After further analysis, GCD withdrew one request but still is seeking a water reservation for flows in the North Fork of Lower Willow Creek.

DNRC has prepared a draft EIS and, during the winter of 1989, will be preparing a final EIS on these reservation requests. A contested case hearing is expected to be held in May 1989. Following this hearing, the Board of Natural Resources and Conservation will take final action on the reservation applications.

## CHAPTER VII

### POTENTIAL FEDERALLY AUTHORIZED WATER PROJECTS

#### BACKGROUND

The water policy bill passed by the 1985 Legislature (H.B. 680) dealt with a diversity of water resource issues. Among them was the need to promote the development of Montana's water resources. The motivation for this interest was founded in an acknowledgment that prudent water development is essential to a productive Montana economy. Equally important, the legislature realized that putting water to wise beneficial use is an important means to establish a legal claim to water. In turn, such claims may be asserted as a legal right that must be recognized and protected in any interstate water apportionment.

In reviewing the state's water development efforts, the legislature noted that a lack of federal funds has severely limited new water project starts. Accordingly, the state must increase its efforts to develop project proposals for which congressional authorizations should be sought. In the interest of promoting needed coordination with the legislature on this matter, the mandate for a biennial report on the state water development program was expanded by the 1985 water policy bill. More specifically, the statute now requires that "the report must identify and rank in order of priority the projects for which the department desires to seek congressional authorization and funding and the efforts the department will undertake in attempting to secure such authorization and funding" (Section 85-1-621 MCA). The following discussion represents the department's response to this statutory directive.

#### Potential Federal Project Authorizations

During the past several years, Congress has expressed a strong reluctance to fund projects that result in expanded irrigation development. On the other hand, there appears to be an increasing interest in efforts that focus on the needs of present-level development. Accordingly, the projects for which the department seeks federal funding authorizations largely fall into the latter category. The first priority project centers on resolving the water shortage problems in the Milk Basin. The next priority effort involves obtaining low-cost federal power for project pumping associated with existing irrigation development in the lower Yellowstone River. The final two undertakings have a similar priority to the Yellowstone River project and involve the rehabilitation of dams at two state-owned water projects, Hyalite near Bozeman and Petrolia near Winnett. Although other projects are being considered, they are in the early planning stages and details of the needed federal authorization strategies have not been developed. Thus, they are not included in this discussion of projects for which federal



funding authorizations will likely be sought during the upcoming biennium. Nonetheless, the issues that are to be addressed in these latter studies are important to Montana and include water supply shortages in the Musselshell Basin and federal assistance in implementing water reservation projects.

### Milk River Project

Present water shortages in the Milk River have placed severe hardships on all water users in the basin. These shortages will become even more acute when irrigators in Canada and on the Fort Belknap Reservation begin using their full legal share of the basin water supply. In the face of this situation, the DNRC, the Milk River Irrigation Districts, and the U.S. Bureau of Reclamation have undertaken a comprehensive planning program that has identified means to reduce the present and projected shortages. Among the actions involved are those of increasing water use efficiencies in the basin, intensifying water management activities, developing new water storage, and importing additional flows from outside the basin. A course of action cannot be determined until relevant planning studies are completed. At this time, it is anticipated that such work will be concluded by the middle of 1989.

To secure the needed congressional authorization, DNRC plans to prepare two separate planning reports. One centers on the alternative of importing water into the basin. The other consolidates findings from rehabilitation and betterment studies of the present water conveyance systems in the seven irrigation districts involved. Once these studies are finalized, the participants will determine what recommended plan will be submitted to Congress. Depending on the course of action selected, the sponsors can use one or both of the planning reports to present their case for federal funding assistance.

In general, the recommended plan would first seek to maximize the conservation of water on the existing irrigation projects and thereby minimize the cost, or eliminate the necessity of providing additional water for irrigators within the basin. Further, the recommended plan, whether it involves a basinwide rehabilitation and betterment effort, the importation of water, or a combination of both, will be submitted for funding in accordance with provisions of the Pick-Sloan Missouri Basin program as authorized by the Flood Control Act of 1944. Through the Pick-Sloan Program, irrigators would not be required to repay project expenses that exceed their ability to pay. There would be no interest charge and power for primary pump lifts would be provided at a rate of 2.5 mils per kilowatt hour.

### Federal Power for Existing Irrigation Projects

The Pick-Sloan Missouri Basin Program included provisions to develop nearly one million acres of irrigated land in Montana. The plan included low-cost financing for irrigation projects and

established a rate of 2.5 mills per kilowatt hour for irrigation pumping. Only five percent of the land planned for irrigation development in Montana has received federal authorization to receive these benefits. Much of the remaining irrigable land in the state has been developed without the benefit of federal financing and is currently irrigated using power costing ten to twenty times more than Pick-Sloan power. Because Montana's irrigators face difficult economic conditions and have not received the irrigation benefits promised under the Pick-Sloan Program, the state is working to obtain congressional authorization for low-cost federal power to existing irrigation projects in the Missouri River basin.

The strategy that is being followed involves DNRC coordination with conservation districts, the Bureau of Reclamation, and Montana's congressional delegation to obtain congressional authorization of Pick-Sloan benefits. Since there is no established process for authorization of benefits to existing projects, the approach is to select three irrigation projects for a pilot effort. The Treasure, Rosebud, Custer County, Prairie County, Dawson County, and Richland County conservation districts in the lower Yellowstone River basin, working as the Lower Yellowstone Conservation District Development Committee, selected the Hammond Irrigation District project, the Hathaway project, and the Heidel Bros. project in their areas as candidates for the authorization attempt. In 1988, the committee received a Water Development Program grant to develop legislation and pursue congressional support for approval of power benefits to the pilot projects. Grant funds will also be used by the committee to cost-share with the Bureau of Reclamation for technical assessments of each project if required by Congress. Once the studies have been completed, the committee will work with the project owners and DNRC in order to formally request congressional approval. If the effort is successful, the department will use it as a basis for developing eligibility criteria for other projects in the Missouri River basin which may benefit from federal power acquisition.

Although this effort is uncertain, it could provide a method for the state to obtain benefits which have long since been promised under the 1944 Flood Control Act. Federal power could provide a cost savings of as much as 30 mills per kilowatt hour for the electrical energy required for irrigation. Long-term benefits include price stability for electricity because the federal power could be obtained at a fixed rate. Other benefits from federal project authorization could include federal technical assistance and low-cost financing for irrigation project rehabilitation.



## CHAPTER VIII

### STATE-OWNED WATER PROJECT REHABILITATION

The State of Montana owns 25 water storage projects which were constructed in the 1930's and 1940's. While their original purpose was to store water for irrigation, many now provide important recreation and flood control benefits as well. The two largest are the Tongue River Project in Big Horn County and Deadman's Basin Project in Golden Valley and Wheatland counties. These two projects have a combined storage capacity of almost 145,000 acre-feet. Part of the funding provided by the Water Development program is intended to resolve safety problems at state water projects while maintaining the benefits those projects provide to local economies.

DNRC provides the maintenance and rehabilitation services for these water projects. Many of the state's water projects have been in operation for about 50 years. In some cases, structural components of the projects are deteriorating simply because of age. In other cases, the design of these projects reflects the standards of the times when the projects were built, but does not meet the dam safety standards of today. Those project components which most frequently require rehabilitation are the spillways and the outlet works. Many of the project spillways are not large enough to pass flood flows of the magnitude required under current dam safety guidelines. During the four-year U.S. Army Corps of Engineers (Corps) Phase I dam safety inspection program, 22 state-owned water projects were inspected. Twelve projects were declared unsafe, primarily because of inadequate spillway capacity to meet current dam safety guidelines. To update these projects to meet current guidelines, the DNRC is completing feasibility studies to identify a preferred alternative to pursue funding to rehabilitate the projects.

Besides ongoing long-term rehabilitation efforts, annual dam safety inspections have been made at all state-owned water projects since 1972. Because of these inspections, maintenance and repair needs are identified and plans are made to complete the necessary repairs. Minor maintenance and repair is completed by the water users, with the department providing technical and field assistance. On many state projects, however, deteriorating spillways, outlet works, drains, or embankments require a major, technically complex rehabilitation effort. These repairs are completed under the direction of the department, and are typically financed through the water development program. The funds support both pre-construction activities, including feasibility studies, final design and development of plans and specifications, and construction activities.

The DNRC is also required to investigate the feasibility of developing hydropower at all state-owned projects. If hydropower



development is found feasible, the department will attempt to lease the site to public utilities or electric cooperatives. If another entity obtains the federal authorization to develop hydropower at a project, the department will negotiate a lease with that entity. If a lease is not possible, DNRC is authorized to construct and operate feasible projects. The goal of hydropower development is to generate revenue to be returned to rehabilitation efforts.

DNRC is continuing to develop Emergency Action Plans as time permits. The department has developed or is finalizing emergency warning and evacuation plans for the Broadwater Project (Broadwater County), Cooney Dam (Carbon County), Middle Creek Dam (Gallatin County), Painted Rocks Dam (Ravalli County), Petrolia Dam (Petroleum County), Ruby Dam (Madison County), and Tongue River Dam (Big Horn County). Using these plans will reduce property damage and loss of life in the unlikely event of a dam failure.

The following dam projects have structural components that are deteriorating and in need of repair or involve total rehabilitation of the project to meet current dam safety guidelines.

#### SPECIFIC REHABILITATION EFFORTS

##### Bair Dam (Meagher County)

The water users are continuing to work on repair recommendations at the dam. Department engineers and the water users repaired the jet pump at the dam during the spring of 1988. This work entailed taking apart the jet pump plumbing and removing debris. The water users hired a contractor to complete concrete repairs to the spillway in 1987, but the contractor did not get a good bond between the old and new concrete, so those repairs will have to be redone. The spillway is in very poor condition and will need at least partial replacement in the coming years.

##### Broadwater-Missouri Dam (Broadwater County)

An Emergency Action Plan (EAP) for Broadwater-Missouri dam was completed. The plan outlines the responsibilities of the dam tender and DNRC during a dam emergency. Flood inundation maps were prepared for the area immediately downstream of the dam. The plan is being rewritten because of recent changes in the Federal Energy Regulatory Commissioner's guidelines for Emergency Action Plans. As part of the updating of the plan, the current plan will be tested this fall.

##### Cooney Dam (Carbon County)

In both 1987 and 1988 the reservoir has filled enough so that the spillway was used for the first time since the dam was

rebuilt in 1982. In 1987 some sink holes were discovered in the right abutment. This area was repaired by the water users' associations and the county rebuilt the road in this area. No sink holes were found following the high water in 1988. Some wave erosion was found near the gatehouse in 1987 and was also repaired by the association. Some of the riprap below the spillway has been moved by the high flows, and the water users are planning on repairing this in the fall of 1988.

#### Cottonwood Dam (Park County)

The repairs to Cottonwood Dam were completed in 1987. The total cost was \$178,000. The major repair items included the replacement of the spillway floor slab, removal of the material below the slab and the replacement of it with a free-draining gravel with drain pipes, extension of the height of the spillway sidewalls, installation of baffles in the chute, and replacement of the wooden flashboards with a concrete guard dike.

#### Deadman's Basin Dam (Wheatland/Golden Valley County)

Because of the drought in 1988, the water users had to dredge out the silt and debris from the inlet channel to the dam's outlet works in order to provide downstream water. In the spring of 1988 the water users' association hired a contractor to repair a concrete wall in the outlet stilling basin that had been severely eroded. Aerial photos were taken of the dam and reservoir for future topographic mapping of the dam and reservoir.

#### Flint Creek Project (East Fork of Rock Creek Dam) (Granite County)

The water users have been completing many of the maintenance items discovered during the annual dam safety inspections. They have hired a contractor to make concrete repairs to the spillway and the outlet.

During the fall of 1988 when the reservoir was empty, aerial photos were taken of the reservoir for future use in making a new topographic map of the dam and reservoir.

#### Fred Burr Reservoir Dam (Ravalli County)

During the fall of 1987 the water users' association hired a contractor to repair the deteriorating concrete in the outlet tunnel and the spillway. The association received a loan from DNRC to complete the repairs. During the 1988 annual dam safety inspection, the repairs were found to be holding up very well.

#### Frenchman Dam (Phillips County)

In 1984, 1987, and 1988 the reservoir went dry. This has

allowed inspection of the complete upstream face of the dam, which was found to be in excellent condition. Aerial photos and topographic maps were prepared in 1984, and it was found that 46 percent of the reservoir capacity has been lost to sediment accumulation. The water users have been completing repairs to the spillway concrete and repairing the floor and wall joints.

#### Martinsdale Dam (Wheatland/Meagher Counties)

The department completed concrete repair to the spillway and construction of the seepage collection and monitoring system in the fall of 1985. The department monitors the new drains on a biweekly basis during the spring and summer, and bimonthly during the fall and winter. The total cost of engineering and construction was \$264,000 and the project cost was financed through a Coal Severance Tax Loan and a state grant.

Additional drains to control seepage in the right abutment of the north dam were added in the fall of 1987. When the reservoir was full, the seepage through the abutments was greater than the capacity of the new drain system that was installed in 1985. The cost of the additional drains was \$10,000 which was paid by the water users' association.

The department is planning to construct an auxiliary spillway to allow the project to route the Probable Maximum Flood (PMF). The auxiliary spillway will be approximately 35 feet wide and located in the abutment of the East dam. The total cost for engineering and construction is about \$60,000, which will be financed through a loan from the department to the water users' association.

#### Middle Creek (Hyalite) Dam (Gallatin County)

A feasibility study of Middle Creek Dam to bring the dam into compliance with current state-of-the art dam safety design standards was completed in February 1985. The preferred alternative for rehabilitating Middle Creek Dam is to raise the dam crest 10 feet, raise the reservoir level by 8.2 feet, rebuild the existing spillway structure and install a second spillway to channel the water to Hyalite Creek, and construct a new emergency spillway in the left abutment. The estimated total project cost is about \$5 million.

The department made an application to the Bureau of Reclamation for a Small Reclamation Projects loan in April 1987 to rehabilitate the project. The loan was approved by the Bureau of Reclamation, but the project was not funded by Congress for the 1989 federal fiscal year. DNRC is continuing with the design and review process so construction can begin when funding is obtained. The department is also continuing to work to obtain the Special Use Permit for construction and operation of the project from the Forest Service.



The grayling habitat studies were completed during this biennium. The recommended mitigation plan is to divert flows into a dry side channel upstream of the new reservoir to create new spawning habitat for the grayling. The existing habitat will be inundated when the reservoir level is increased. DNRC completed the diversion structure in the fall of 1988. The department will monitor the hydraulic characteristics of the side channel to verify that the habitat created corresponds with the requirements of the mitigation plan.

The department has appealed to the Office of the Forest Service in Washington, D.C., to waive the Special Use Permit Fee being requested by the Forest Service. The annual fee requested by the Forest Service will escalate from an initial \$4,200 as land values increase.

#### Nevada Creek Dam (Powell County)

The water users' association has been working on the maintenance recommendations that were found during the annual dam safety inspection. The reservoir went dry in 1988, and aerial photos were taken of the dam and reservoir for future use in making topographic maps of the dam and reservoir area. The spillway at the dam is in poor condition and sections of the spillway will need replacement in a few years. Some of the repair work performed by the water users has extended the life of the spillway, but major repairs will still be necessary.

#### North Fork of the Smith River Dam (Meagher County)

This state-owned water project is located approximately 10 miles northeast of White Sulphur Springs, Montana. The dam is a 91-foot-high, 1,400-foot-long earthfill structure that impounds 11,500 acre-feet of water. The main purpose of the project is to provide water for irrigation and recreation use.

In 1981 the project was inspected as part of the U.S. Army Corps of Engineers (Corps) Phase I Inspection Program. Based on the Corps criteria, the spillway is seriously undersized for a high hazard dam, and the project was subsequently declared unsafe. The inspection also noted areas of seepage at the downstream toe of the dam.

DNRC has begun a preliminary engineering study of the project to address issues presented in the Corps report. Rehabilitation alternatives will be developed to determine the best way to correct the deficiencies of the project. The department should complete approximately one half of the study this biennium. A very preliminary cost estimate for the rehabilitation of the project is \$2 million.

#### Painted Rocks Dam (Ravalli County)

The department awarded a contract in the spring of 1987 to



repair the deteriorating concrete in the spillway floor joints and spillway sidewalls. The work was completed in August, 1987. The total cost of the repairs was \$30,000.

In September 1988 remedial repairs were completed to some of the repaired spillway joints. The costs were paid for through the performance bond at no cost to the department. Also in September 1988, the cables on the operating gates were replaced at a cost of \$4,150.

Due to budget constraints not all of the needed repairs to the spillway were accomplished. Additional design and construction will be completed as funding permits.

#### Petrolia Dam (Petroleum County)

A rehabilitation study was completed in 1986 which described a recommended alternative to bring the dam up to current dam safety standards. The cost estimate to complete the necessary repairs to the dam is \$3 million. The necessary work includes raising the dam crest by seven feet, replacing a portion of the existing spillway and constructing an emergency spillway. No increased reservoir storage will be provided. The rehabilitation of the dam was found to be technically feasible, but not financially feasible.

Because the water users' association cannot afford the rehabilitation at the present time, the department is developing a plan to install a warning system to be used in case of an emergency at the dam. The early warning system will be used in conjunction with the emergency warning plan that is being prepared for the dam. The estimated cost of the early warning system is \$25,000.

The existing spillway is in very poor condition. It is partially undermined and several of the concrete joints are deteriorating. The water users have filled voids under the floor slab from time to time to prevent it from collapsing. They have placed riprap at the toe of the flipbucket to help control erosion. They have also installed drains around the lower gatehouse to help control seepage.

#### Tongue River Dam (Big Horn County)

In 1978 the Tongue River flooded, causing \$1 million worth of damage to the Tongue River Dam spillway. In 1980 the project was inspected under the U.S. Army Corps of Engineers Phase I Inspection Program. Based on Corps criteria, the project was declared unsafe primarily because of inadequate spillway capacity to route the Probable Maximum Flood. As a result, the 47th Legislature appropriated funds from the Water Development Program so the DNRC could propose a solution to the dam safety problems.

A feasibility study completed by the DNRC, with the assistance of the U.S. Bureau of Reclamation, developed a preferred alternative to solve the dam safety problems at the Tongue River Dam and provide four feet of additional reservoir storage. The preferred alternative is technically feasible but not economically feasible.

Because the preferred alternative was not economically feasible, the department developed several scaled-down alternatives to modify the existing spillway chute and stilling basin. All of these alternatives involve routing flows less than the PMF. Estimated costs for these alternatives were from \$20 million to \$60 million, depending on the spillway design flow.

As the project exists now, it is unsafe and poses a high risk to downstream property and lives. It is being operated at a reduced level.

In 1987, the department completed a risk assessment to help evaluate all of the alternatives that have been proposed to help mitigate the current risks. The risk assessment provided (1) a systematic quantification of the ability of the dam to withstand flooding under the various rehabilitation alternatives, (2) an assessment of downstream damage costs due to flooding and a dam failure, and (3) a determination of the potential loss of life if dam failure occurs.

The Northern Cheyenne Tribe has an interest in the project, but its participation awaits negotiations over Indian reserved water rights. A compact could begin the development of a joint state-federal-tribal project with federal funding available to rehabilitate the project.

The Emergency Warning and Evacuation Plan was updated in 1987 and 1988. It was reviewed by Disaster and Emergency Services (DES) and by counties below the dam. A test of the radio warning system was conducted in February 1988 as a joint DNRC-DES exercise. The radio system did not function properly during the test, and DNRC is modifying the system.

Pursuant to the order of the Board of Natural Resources and Conservation establishing water reservations, DNRC was granted "a reservation of 383,000 acre-feet per year of water allowing the total appropriation of not more than 450,00 acre-feet of water per year, from the Tongue River, to be stored in an enlarged Tongue River Reservoir and to be used for all beneficial uses allowed by Montana Water Law." DNRC is taking the necessary action to maintain the reserved water right.

During a dam safety inspection of the outlet tunnel in the fall of 1987, severe cavitation was found in the transition area immediately below the operating gate. The repairs involved replacing the concrete eroded by cavitation. To complete the repairs to the transition area, it was necessary to close the

gate and dewater the tunnel. This action reduced the flow below the project to less than 5 cfs. In order to provide flows in the river to minimize impacts to the downstream fishery, water was pumped over the spillway. Decker Coal provided six pumps to accomplish this. Total cost to complete the repairs, including pumping costs, was \$26,200. The repairs were completed in March and April of 1987. Annual dam safety inspections conducted in the fall of 1987 and 1988 indicate the repairs are holding up well.

#### Willow Creek Dam (Madison County)

The water users' association has hired a contractor to perform concrete repairs to the spillway during the fall of 1988.

#### Yellowwater Dam (Petroleum County)

The outlet conduit at the dam was replaced in the fall of 1985. Annual inspections completed since replacement indicate the new conduit is functioning satisfactorily.

#### State-owned Hydropower Projects

In addition to the state pursuing hydropower development on its own projects, private development is also being investigated. Private interests have expressed a desire to pursue development of Ruby Dam, Tongue River, Willow Creek, and Painted Rocks Reservoir. FERC preliminary permits were obtained for these projects but only the Painted Rocks permit remains. Limited negotiations are on-going with the permittee.

#### Broadwater Power Project

Since receiving approval from the Board of Natural Resources and Conservation on June 5, 1987, the Department of Natural Resources and Conservation has been proceeding with development of the Broadwater Power Project. The project is scheduled for full operation on March 15, 1989, with contract completion occurring 60 days later.

The department has authority to finance the project with up to \$26 million in water development bonds, which were approved by the 1987 Legislature. Interim financing prior to the bond sale was obtained through a \$1 million coal severance tax bond anticipation note. About \$3.1 million in private placement taxable bonds were sold in October 1987. The taxable bonds will cover expenses anticipated to go beyond December 31, 1988, and for construction of facilities (such as the substation and transmission line) that do not qualify for tax exempt financing. The sale of the balance of approximately \$22.2 million in tax exempt bonds occurred November 5, 1987. It is anticipated these bonds will be repaid from project revenues over a 30-year term.

The project has been separated into multiple contracts to



expedite development, allowing construction to proceed with discrete portions of the project as design work was completed. This has resulted in six major contracts. These contracts account for (1) furnishing and installing the turbine, generator, electrical, and auxiliary equipment; (2) excavating a foundation for the powerhouse and constructing the facility; (3) furnishing electrical equipment and constructing a 100-kV substation; (4) constructing the transmission line; (5) furnishing rubber dams to replace existing flashboards on the spillway; and (6) modifying the spillway and piers, installing the rubber dams, and post-tensioning the dam (anchoring the dam to bedrock with steel cables or tendons).

Turbine/generator design and manufacturing by Voith Hydro Inc. of York, Pennsylvania, began September 22, 1987. Voith was the low bidder at \$5,435,584. Installation of these items into the powerhouse started in November 1988.

Sletten Construction Company of Great Falls was the low bidder for the excavation and powerhouse construction contract at \$6,071,593. Construction at the project site began November 2, 1987.

Lamb Engineering of Salt Lake City, Utah was awarded the bid for the 100-kV substation at \$881,337. Construction began on site in July 1988 and is scheduled for completion by December 31, 1988.

A low bid of \$205,178 by Harp Line Constructors of Kalispell was accepted for the transmission line contract. Work began in September 1988 and is anticipated to be complete by December 31, 1988.

The spillway was designed and bid to have radial gates installed in at least two spillway bays. These gates could be programmed to open in the case of a load rejection, causing the turbine to shut down and rerouting turbine flows over the spillway. If enough money were available, the department also bid the option of placing additional radial gates on other spillway bays. This would provide more flexibility in the operation of the dam during high flows and would lower long-term operation and maintenance costs.

Unfortunately, the low bid received exceeded available funds, even for installing radial gates on just the two spillway bays needed for basic operation. All bids were rejected and the spillways were re-engineered, incorporating inflatable rubber dams, to lower the cost. The DNRC then solicited proposals from contractors to install the rubber dams in the spillway bays. The rubber dams were procured from Bridgestone Corporation of Japan for \$1,150,500. A proposal was accepted from Gracon Corporation of Loveland, Colorado, to modify the spillway bays, post-tension the dam, and install the rubber dams for \$1,602,400. This resulted in a savings of approximately \$450,000. More



importantly, it allowed full control of all seven spillway bays (instead of just two bays), eliminated the old flashboard system and its attendant leakage, and resolved what were perceived to be difficult trash accumulation and ice problems on the face of the dam.

In addition to the major contracts for the Broadwater Power Project, the DNRC must meet numerous requirements under the FERC license and other financial obligations resulting from the project development. Approximately \$928,000 is committed to meeting these requirements, which include:

1. Environmental mitigation for fisheries, waterfowl, and riparian habitat
2. Cultural resource surveys, and recovery and recording of significant resources identified
3. Acquisition of flood easements on lands owned by Montana Rail Link, Bureau of Land Management, and numerous private landowners in the reservoir area upstream of the dam
4. Cost sharing with the Bureau of Reclamation to raise the level of its Toston Irrigation District pumping plant above the new reservoir elevation
5. Joint development of recreational facilities on Bureau of Land Management lands immediately upstream of the dam site
6. Easement acquisition for access roads and right-of-way for the transmission line linking the power plant to the Montana Power Company grid
7. Improvements in the road access (cattle guards, bridges) between the highway and the dam site

The revenues produced by the dam will go into an account earmarked for maintenance and development of state water resource projects. A 35-year power purchase contract with the Montana Power Company is expected to produce between \$11 and \$16 million in project revenues in excess of revenues needed to retire the debt service on the bonds. Hydroelectric projects of this type typically have an operational life of between 50 and 100 years, and revenues are expected to increase over the life of the project.

## CHAPTER IX

### SUMMARY OF PROJECTS PREVIOUSLY FUNDED BY THE WATER DEVELOPMENT AND RENEWABLE RESOURCE DEVELOPMENT PROGRAMS

#### A. Water Projects Considered for Grant Funding by the 1983, 1985, and 1987 Montana Legislatures

A total of 218 grant applications have been considered for funding during the 1983, 1985, and 1987 legislative sessions. Figures 9A.1 and 9A.2 present a breakdown of these applications by applicant and project type and show the number of projects that received funding in each category.

The following water projects were approved for funding by the 1987 Legislature through H.B. 7:

1. Montana State Library was awarded a \$97,712 grant to establish a central index of all sources of existing water resources data in Montana. This program, known as the Montana Water Information System, is being coordinated through the Natural Resources Information System.
2. Beaverhead County Water District was awarded a \$64,000 grant to conduct a rehabilitation study of Lima Dam, which had been declared unsafe in the Corps of Engineers Phase 1 report. A consulting engineering firm has been hired and will have alternative solutions with cost estimates of the selected rehabilitation plan available during the fall of 1988.
3. Montana Bureau of Mines and Geology received a grant of \$98,500 to determine the mobility of agricultural pesticide movement through soils into shallow groundwater aquifers. Intensive monitoring instrumentation has been installed at agricultural experiment stations in Huntley and Bozeman. Wells have been installed and pesticide screening has been conducted at Havre and near Ronan. The primary chemical being investigated is Glean.
4. Hill County received a \$35,000 grant for a rehabilitation study of the Lower Beaver Creek Dam. A consulting engineer has been hired, and the final report and recommendations should be completed by the end of 1988.
5. Treasure Conservation District received a \$100,000 grant to establish a low-interest loan program for district cooperators installing conservation practices. To date, the district has put out two loans totalling approximately \$5,700.

6. The Edgar Canal Water Users were awarded a \$10,000 grant for a bank erosion control project on the Clark's Fork of the Yellowstone River in Carbon County. The prescribed work will be completed during the fall of 1988.
7. The Agricultural Engineering Department of Montana State University is the recipient of a \$37,500 grant that will enable MSU to provide a field evaluation of a plastic canal liner being developed by a private company. The project has recently begun, but it is anticipated that the trial ditches will be lined during the fall of 1988.
8. Flathead Conservation District received a \$75,000 grant to rejuvenate and rehabilitate East Spring Creek near Kalispell. Work began during late spring of 1988 with much of the channel work, fencing, seeding, and planting to be completed in during the fall of 1988. Support from adjacent landowners has been strong.
9. Mineral County was awarded a \$35,000 grant for making improvements to the St. Regis Community Park. A new well and irrigation system has been installed, the old mill pond dredged, and disturbed areas have been graded and seeded. The project will be essentially complete in the fall of 1988. Much of the credit for the success of this project can be given to Shirley Anderson of St. Regis.
10. Carbon County was approved for a grant of \$47,500 and a loan of \$142,500 for making improvements to the Town of Roberts' water system. A grant agreement has not yet been written.
11. Greenfields Irrigation District received a \$2,074 grant for partial payment of the installation of a 12-foot wide Parshall flume in the outlet channel below Willow Creek Reservoir. The project has been completed.
12. Nilan Water Users Association was approved for a \$25,000 grant to line sections of irrigation water delivery canals of the Nilan Reservoir irrigation project. A grant agreement will be written when grant funds become available.
13. Eastern Sanders County Conservation District was awarded a grant of \$86,300 to conduct, in cooperation with MBMG, a pilot groundwater recharge study. As proposed, the Lone Pine aquifer south of Kalispell will be recharged with water from the Little Bitterroot River injected into the aquifer during spring flows. A grant agreement will be written when grant funds become available.

14. Montana Rural Water Association was approved for a grant of \$60,000, which will be used to support a technical assistance advisor. This person will provide technical assistance and training to operators of rural water systems throughout the state. A grant agreement will be written when grant funds become available.
15. The Town of Cascade was approved for a \$50,000 grant and a \$150,000 loan to improve its water distribution and supply system. A grant agreement will be written when grant funds become available.
16. The City of Shelby was awarded a grant of \$25,000 and a loan of \$75,000 to rehabilitate the city water supply wells. A grant agreement will be written when grant funds become available.

FIGURE 9A.1  
**WATER DEVELOPMENT PROGRAM**  
 APPLICANTS BY APPLICANT TYPE - 1983-1987

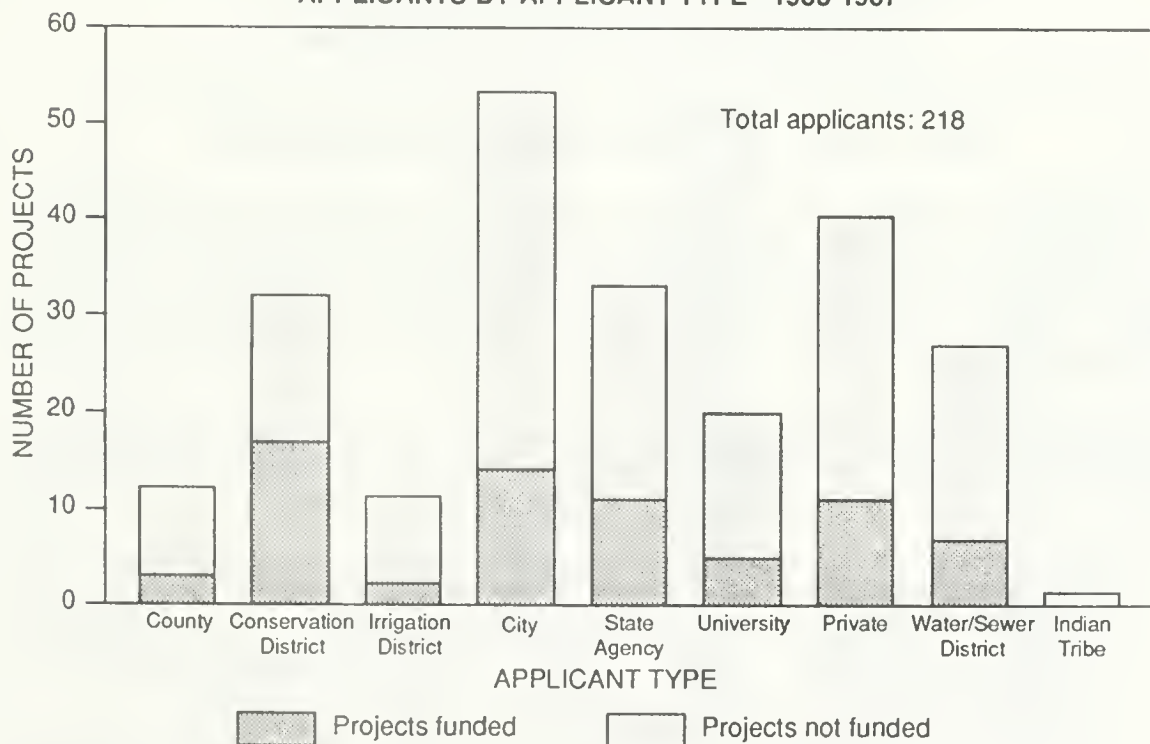
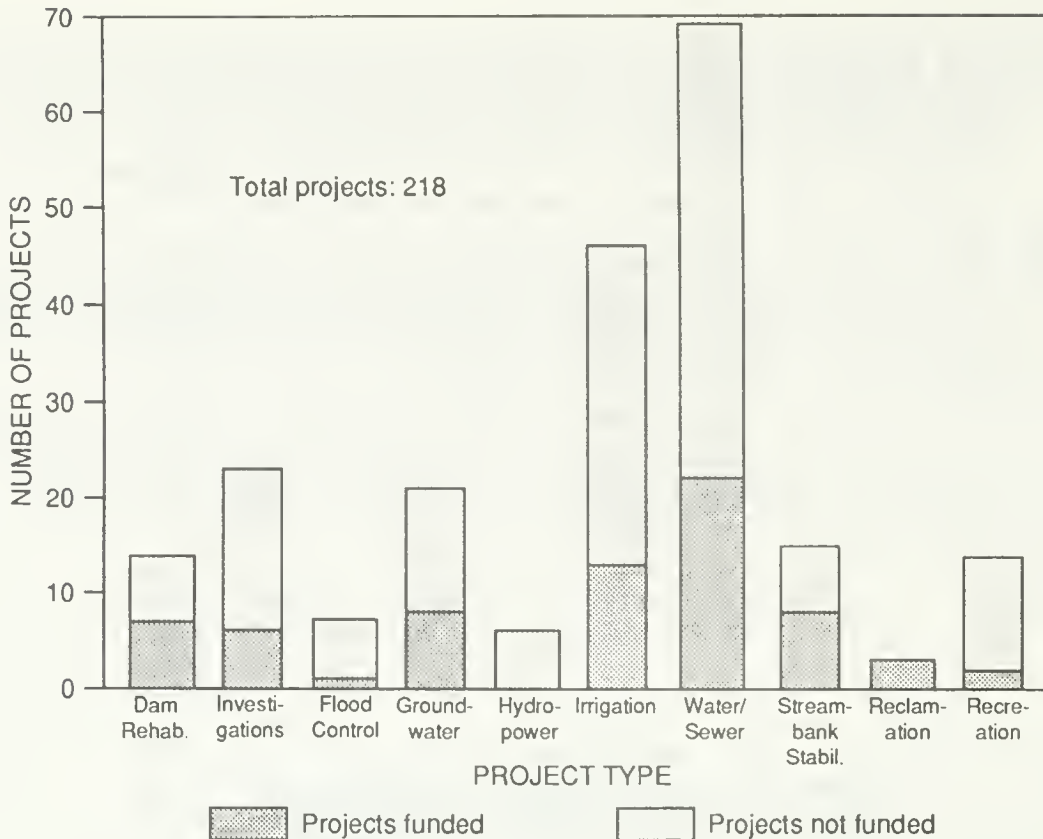




FIGURE 9A.2  
**WATER DEVELOPMENT PROGRAM**  
 APPLICANTS BY PROJECT TYPE - 1983-1987



#### B. Projects Approved for CST Loans by the 1983, 1985, and 1987 Legislative Sessions

The 1983, 1985, and 1987 Montana legislatures considered 65 applications for Water Development loans over \$200,000. Figures 9B.1 and 9B.2, which follow section B, clearly show that municipal water projects make up the largest percentage of project types, and that cities and water districts were the most common applicants.

The following projects were approved by the 1987 Montana Legislature to receive Coal Severance Tax loans, which have been completed during the during the 1988-1989 biennium:

1. City of Harlem received a \$403,125 loan at an interest rate of 5.32 percent for the first five years, and 7.32 percent for the remaining 15 years of a 20-year term. The loan was used to finance the renovation of the town's deteriorated water system.
2. The Town of Lima received a loan of \$250,000 at an interest rate of 5.32 percent for the first five years, and 7.32 percent for the remaining 15 years of a 20-year term. The loan was used to finance the renovation of the town's deteriorated water system.

3. Mill Creek Water District received a loan of \$950,000 at an interest rate of 3 percent for a 30-year term. The loan is being used to finance a gravity irrigation system. The project will convert 3,300 acres from flood and pumped irrigation to correct inefficient water use, crop loss, erosion, and high-energy cost.
4. Town of West Yellowstone is authorized for a loan of \$1,500,000. The town has received a loan of \$515,000 at 7.32 percent interest for 20 years to finance Phase I of construction of a central water system. It is anticipated that it will need \$625,000 to complete the construction of Phase II of its system.

The following projects were approved for Coal Severance Tax loans by the 1987 Legislature, but have not requested their funds:

Town of Browning	Water Treatment and Transmission Facilities
City of Helena	Ten Mile Water Improvements
Dept. of Fish, Wildlife Parks	Gartside Dam

FIGURE 9B.1  
**COAL SEVERANCE TAX PROGRAM**  
 APPLICANTS BY APPLICANT TYPE - 1983-1987

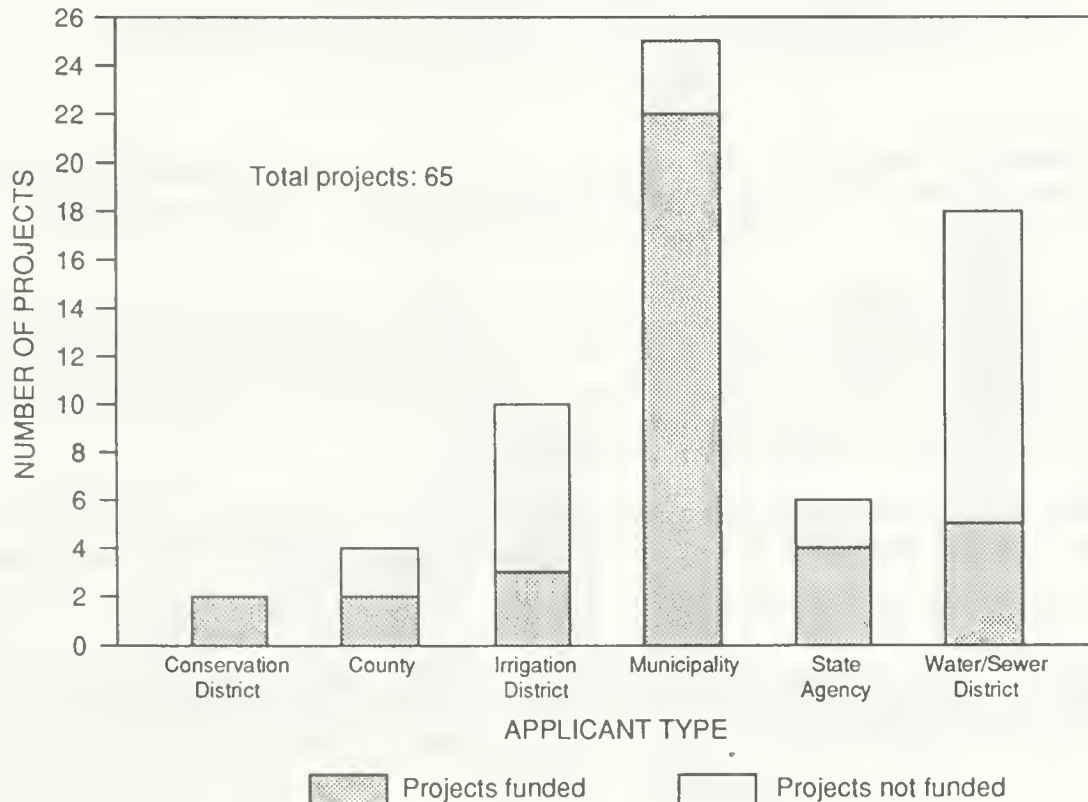
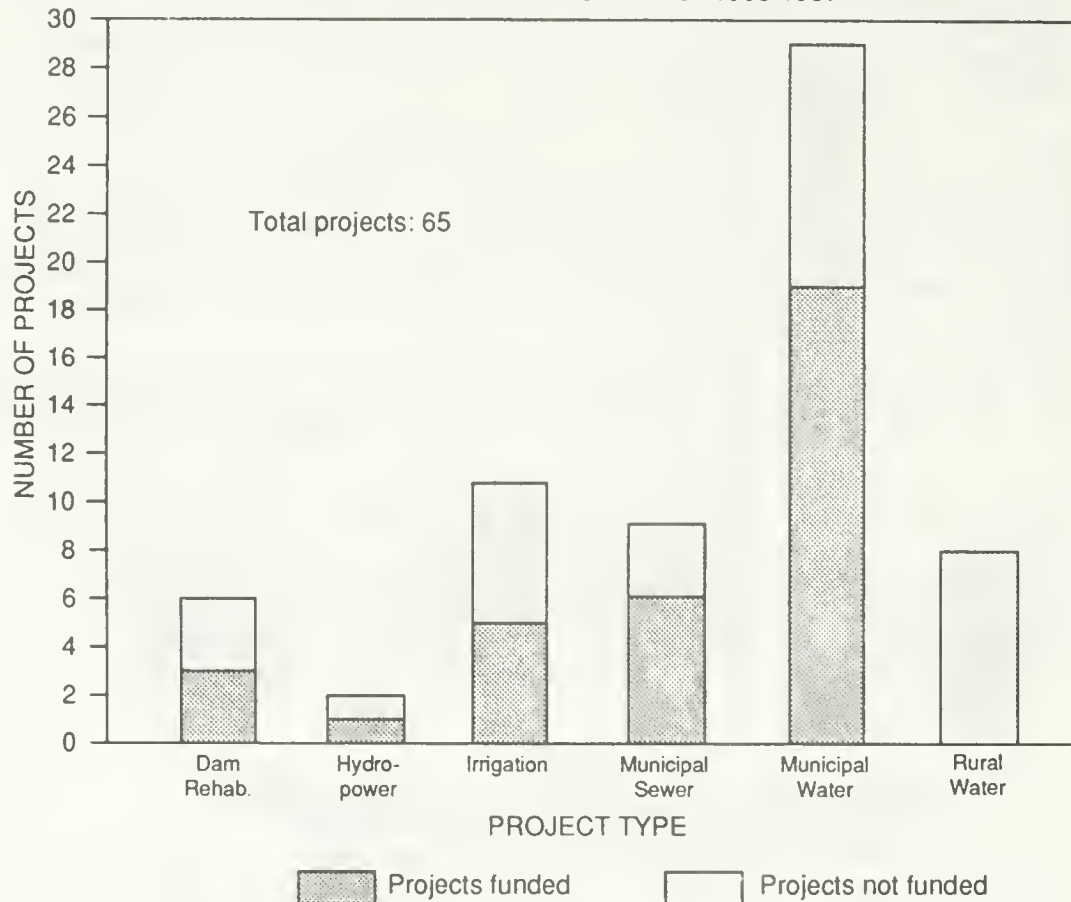


FIGURE 9B.2  
**COAL SEVERANCE TAX PROGRAM**  
 APPLICANTS BY PROJECT TYPE - 1983-1987



**C. Renewable Resource Development Program - Non-Water Projects  
 Considered for Grant Funding by the 1983, 1985, and 1987  
 Montana Legislatures**

The 1983, 1985, and 1987 legislatures considered a total of 63 grant applications for non-water projects under the Renewable Resource Development Program. As shown by Figures 9C.1 and 9C.2, state agencies have submitted the largest number of applications, and most project applications received have been for the agricultural land improvement category.

The following projects were approved by the 1987 Montana Legislature to receive grant funds during the 1988-1989 biennium:

**Agricultural Land Improvement Category**

1. Hill County Conservation District received an \$8,000 grant, which has been used to cost-share the purchase of a grass drill for use by district cooperators on CRD acreage.

2. The Conservation Districts Division of DNRC received a grant of \$9,300 to cost-share the purchase of electronic survey equipment with the Soil Conservation Service. The equipment is allowing the SCS to more quickly survey and design land treatment and conservation practices.

#### Timber Improvement Category

1. Anaconda-Deer Lodge County was approved for a grant of \$63,650 for a tree planting/soil stabilization and erosion control project.
2. Madison Conservation District received a grant of \$23,850 for implementation of a forest land management program. A mobile dimension saw has been purchased, which will be available to district cooperators on a lease basis.

#### Water Reservation Development Category

1. The Conservation Districts Division of DNRC was approved for a grant of \$50,000. This money will be made available to conservation districts upon request for development of water reservations and the preparation of water reservation applications.

FIGURE 9C.1  
**RENEWABLE RESOURCE DEVELOPMENT PROGRAM**  
APPLICANTS BY APPLICANT TYPE - 1983-1987

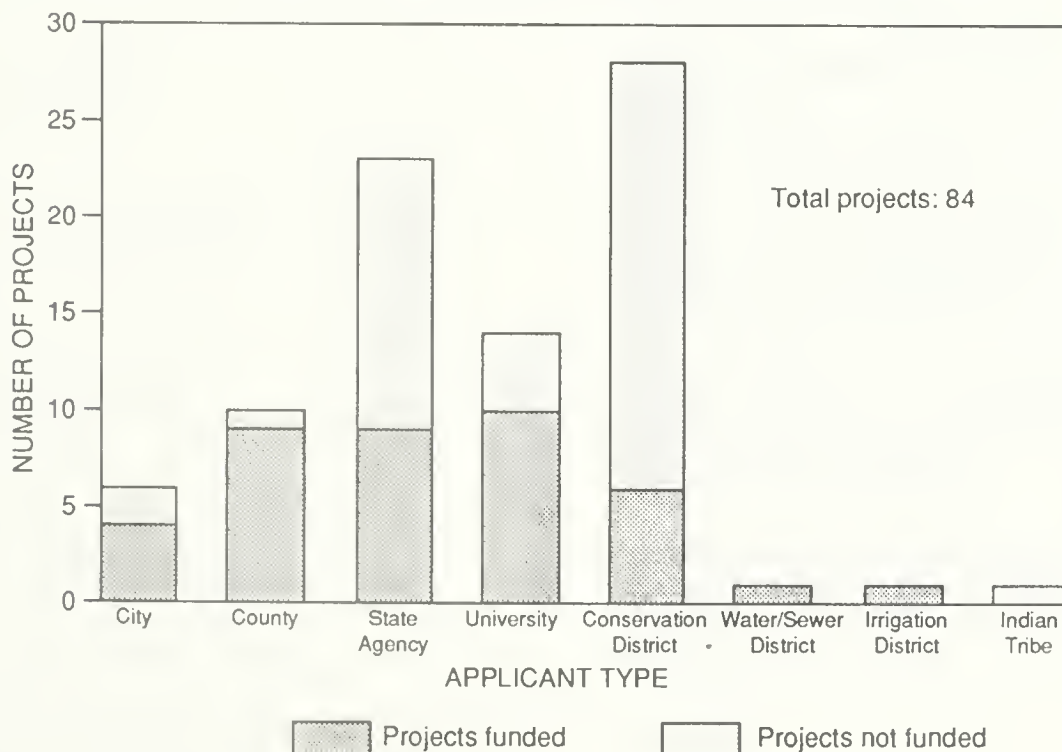
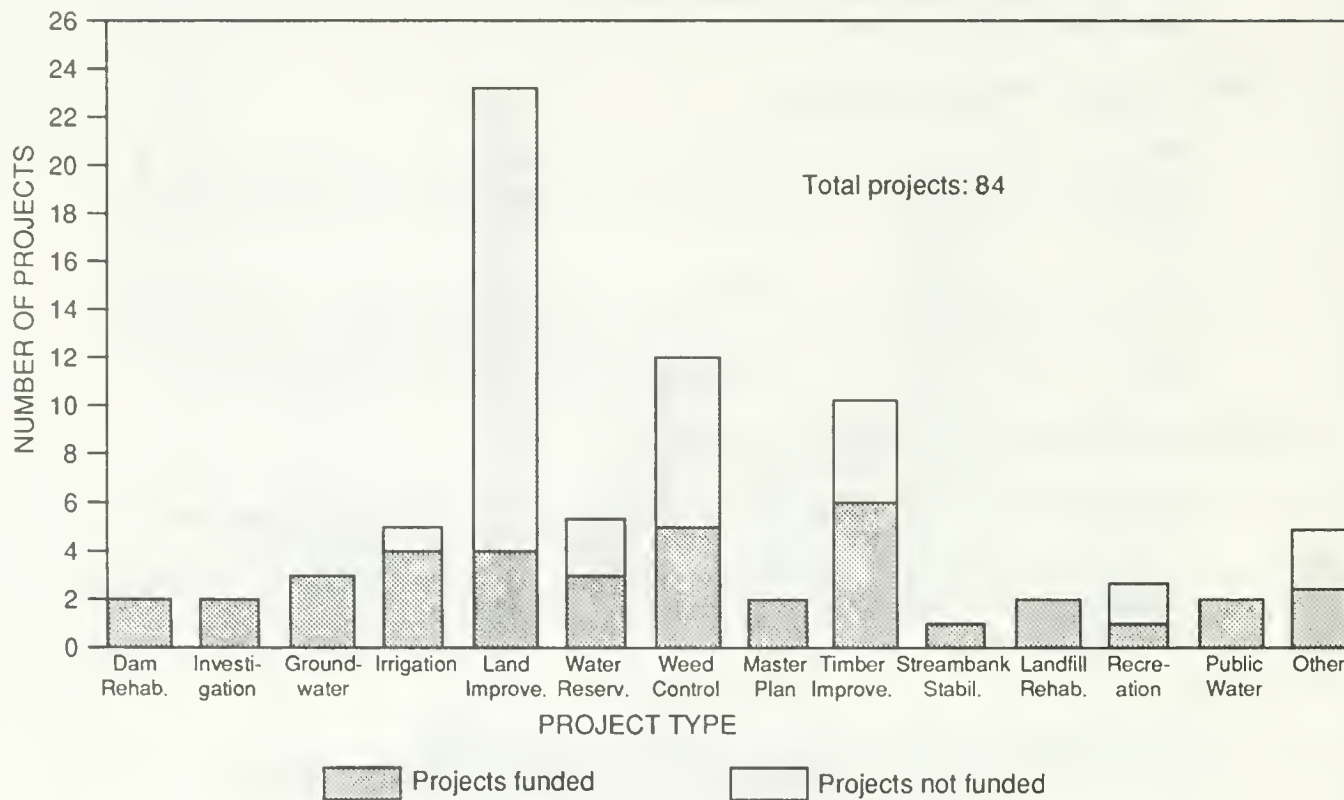




FIGURE 9C.2  
**RENEWABLE RESOURCE DEVELOPMENT PROGRAM**  
 APPLICANTS BY PROJECT TYPE - 1983-1987



## APPENDIX A

### WATER DEVELOPMENT ADVISORY COUNCIL

A Water Development Advisory Council (named below) was appointed by Governor Schwinden to review all grant and loan applications and assist the department staff in developing ranking order priorities and funding recommendations. The Council was established in accordance with Section 2-15-122(31), MCA. The department greatly appreciates the input and effort of each of the Council members.

Verne House, Chairman	Extension Service Montana State University Bozeman, MT 59717
Representative Angela Russell	Box 333 Lodge Grass, MT 59050
Senator Thomas Keating	Box 20522 Billings, MT 59104
Representative Bob Thoft	1520 Burnt Fork Road Stevensville, MT 59870
Representative Harold Poulsen	1537 Meadowlark Drive Great Falls, MT 59404
Alyce Kuehn	Montana League of Cities & Towns Ekalaka, MT 59324
Ted Eklund	Montana Association of Counties Rural Route Ryegate, MT 59074
Lorents Grosfield	Montana Association of Conservation Districts North of Big Timber Big Timber, MT
Mark Etchart	Montana Water Development Association 514 6 Avenue North Glasgow, MT 59230
Kim Wilson	Montana Environmental Information Center 405 No. Last Chance Gulch Helena, MT 59601

Dave Jones

Montana Rural Water  
Association  
Box 274  
Hingham, MT 59528

Fred Flanders

615 Henderson  
Helena, MT 59528

Bernard Harkness

Dell, MT 59724

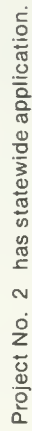
## APPENDIX B

### ACKNOWLEDGEMENTS

The Department of Natural Resources and Conservation would like to thank the following persons who participated in the preparation of this report: Larry Fasbender, Director; Gary Fritz, Administrator, Water Resources Division; Caralee Cheney, Chief, Water Development Bureau; Rich Moy, Chief, Water Management Bureau; Bob Morgan, Loan and Grant Supervisor; Steve Schmitz, Project Development Supervisor; Gerhard Knudsen, Section Supervisor, Water Management Bureau; Glen McDonald, Section Supervisor, Engineering Bureau; Les Pederson, Program Officer; Larry Bloxsom, Financial Specialist; Greg Wermers, Municipal Projects Engineer; Dave Aune, Agricultural Projects Engineer; Theresa Blazicevich, Resource Specialist; John Sanders, Missouri Reservation Coordinator, Water Management Bureau; Nancee Miller, Project Monitor; Mary Hofmann and Rose Bond, who typed the report; Will Harmon, who edited the report; and Gordon Taylor, Don Howard, and Barbara Lien, who coordinated the printing of the report.



## 1988



Numbers within symbols are project numbers as ranked

## 1988



[illegible]

## Grant Applications

Numbers within symbols are project numbers as ranked.







Water Development Bureau  
Montana Department of Natural  
Resources and Conservation  
1520 East Sixth  
Helena, MT 59620-2301